Preliminary - Subject to Change Without Notice

Honeywell

SYSTEM INSTALLATION MANUAL

KHF 1050

HF COMMUNICATION SYSTEM

MANUAL NUMBER 006-10640-0000
REVISION 0, March 2003

Preliminary - Subject to Change Without Notice

WARNING

PRIOR THE EXPORT OF THIS DOCUMENT, REVIEW FOR EXPORT LICENSE REQUIREMENT IS NEEDED.

Honeywell

System Installation Manual

P/N 006-10640-0000

KHF 1050
HF Communication System

(Also known as Primus HF 1050)

KAC 1052 Antenna Coupler
KPA 1052 Power Amplifier
KRX 1053 Receiver/Exciter
Compatible HF Control Units

REVISION HISTORY

KHF 1050

SYSTEM INSTALLATION MANUAL

23-10-09

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INTRODUCTION

1. General

This manual provides description and operation, testing, fault isolation, installation, maintenance, and flightline checkout procedures for the KHF 1050 HF Communication System.

2. Layout of Manual

Section 1	Description and Operation
Section 1000	Testing and Fault Isolation
Section 2000	Installation and Maintenance

Refer to the Table of Contents for the location of applicable information.

Weights and measurements in the manual are in English units, unless otherwise stated.

3. Revision Service

The manual will be revised as necessary to reflect current information. Service Bulletins may be issued separately, and will be incorporated in the manual as appropriate.

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Glossary of Terms and Abbreviations	
A/C	Aircraft
AGC	Automatic Gain Control
AME	Amplitude Modulation Equivalent
ARM	The ready to operate status of a function/device.
CFR	Clarifier
CLK	Clock
COMP	Compatible
CPLR	Coupler
GND	Ground
HF	High Frequency
LCD	Liquid Crystal Display
LSB	Lower Side Band
MCDU	Multifunction Control and Display Unit
MIC	Microphone
NVG	Night Vision Goggles
ORTHOGONAL	Intersecting at right angles.
PA	Power Amplifier
PROC	Processing, Processor
PEP	Peak Envelope Power
PTT	Push To Talk
PWR	Power
RC	Reduced Carrier
RCVR	Receiver
RDY	Ready
REF	Reference
RF	Radio Frequency

Glossary of Terms and Abbreviations	
RMU	Radio Management Unit
RTCA	Radio Technical Commission for Aeronautics
RTN	Return
RX	Receive
SELCAL	SELective CALling
SELECTIVITY	The ability of a receiver to differentiate desired RF signals from undesired signals and other disturbances within specified frequency and dB limits.
SENSITIVITY	The ability of a receiver to detect and demodulate desired signals at specified minimum RF levels.
SIDETONE	The small portion of the transmitter signal that is fed back to the receiver's audio circuit.
SIG	Signal
SQUELCH	The ability to disable the demodulated output of a radio receiver until a preset level of RF input is received. The level of received RF signal required to break squelch is determined by the squelch control setting.
SSB	Single Side Band
SYN	Synthesize(r), Synchronize(r)
TCXO	Temperature compensated crystal oscillator
TRANLINE	Transmission Line
TX	Transmit
USB	Upper Side Band
VOL	Volume
VSWR	Voltage Standing Wave Ratio
XCTR	Exciter (low level signal source that drives power amplified transmitted signal).
XMT	Transmit
XMTR	Transmitter

DESCRIPTION AND OPERATION

1. System Description

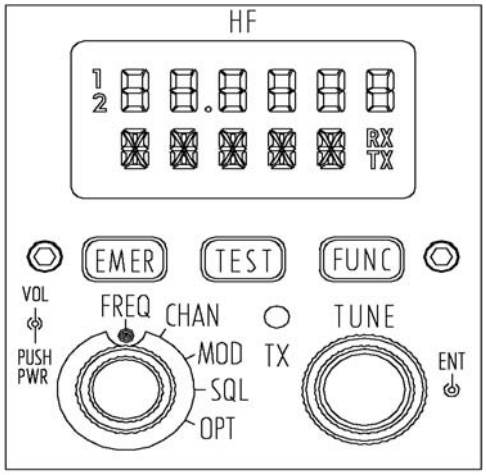
A basic KHF 1050 HF Communication System consists of three individual units: KAC 1052 Antenna Coupler, KPA 1052 Power Amplifier, and KRX 1053 Receiver/Exciter. A compatible control unit is also required. Control units compatible with the system include the Gables PS440, Honeywell MCDU Multifunction Control and Display Unit and Honeywell RM-855 Radio Management Unit.

NOTE: For complete installation information on the Gables PS440 refer to the PS440 Control Display Unit Installation Manual P/N 006-10655-0000.

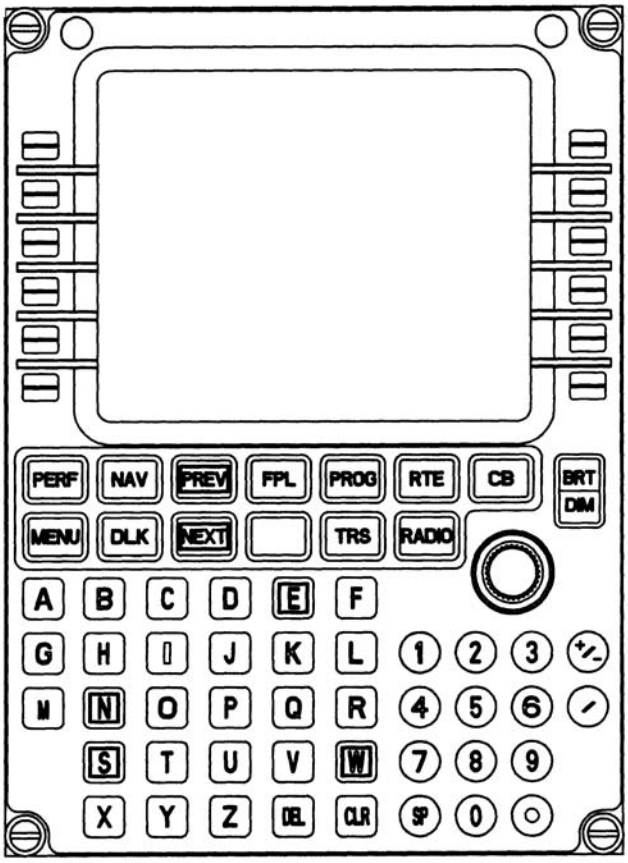
For complete installation information on the MCDU Multfuntion Control and Display Unit refer to the MCDU Installation Manual P/N XXXX.

For complete installation information on the RM-855 Radio Management Unit refer to the RM-855 Installation Manual P/N XXXX.

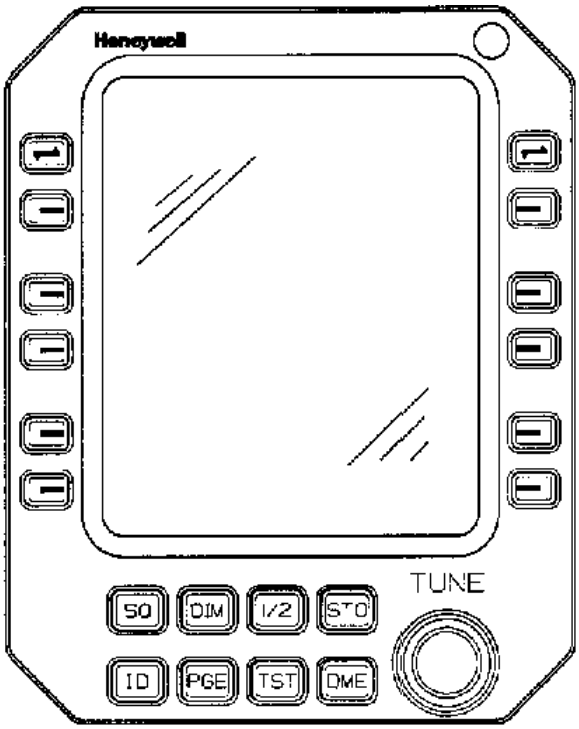
Typical System
Figure 1



PS440 Control Display Unit
Figure 2



MCDU Multfunction Control and Display Unit
Figure 3



RM-855 Radio Management Unit
Figure 4

1.A. System Overview

The KHF 1050 HF voice and data communication system is a solid state design with 200 watts (PEP) of output power, operating at 28 Vdc. Frequency of operaton ranges between 2.0 and 29.9999 MHz with 100 Hz resolution. Systems may be strapped to set the upper frequency limit to 22.9999 MHz.

NOTE: Operations are limited to 25 MHz for aircraft installation by aeronautical mobile band frequency limits.

A configuration is called a “dual system” when two KHF 1050 HF systems are installed in the same aircraft to share one antenna. Both systems may receive simultaneously, but only one system is chosen to transmit at any one time. An auto select transmit scheme determines which system is selected to transmit.

In an auto select configuration, the first system (System 1 or System 2) to be keyed is selected to transmit, and transmission from the other system is inhibited until the first system has stopped transmitting.

The RM-855 Radio Management Unit, the MDCU Multifunction Control Display Unit, or the PS440 Stand-Alone HF Controller determines the frequency and mode of operation of the system and displays that information to the pilot.

Receiver and low level transmitter signals are located in the KRX 1053 Receiver/Exciter. The KRX 1053 Receiver/Exciter employs an oven controlled oscillator, which requires a short warm-up period to generate the frequency reference required for the synthesizer.

The KAC 1052 Power Amplifier amplifies the excitation signal from the KRX 1053 Receiver/Exciter to 200 watts PEP, or 50 watts of carrier power in AM. The amplified signal is routed to the KAC 1052 Antenna Coupler, which matches the various impedances of the antenna to the 50 ohm output of the transmitter. In receive function, signals from the antenna pass through the KAC 1052 Antenna Coupler to the KRX 1053 Receiver/Exciter.

The KHF 1050 can be installed as a single or dual HF system. In a dual system when one system is transmitting, receive on the other system is disbled. The single antenna in a dual system can be tuned to only one frequency at any given time. If the two systems are tuned to different frequencies, the strongest reception is realized on the primary system, which is tuned to the same frequency as the antenna. The primary system is defined as the system that was last used for transmission in auto-select configuration. The secondary system would employ an internal bridging amplifier to improve reception. No external accessories ae required for dual system operation for the KHF 1050.

When two independent HF systems employing two separate antennas are used on one aircraft, it is important to maximize separation between the antennas. A minimum of 6 ft. (2 m.) separation is recommended and the antennas should be configured as orthogonally as possible.

WARNING: IN A DUAL KHF 1050 INSTALLATION, PERMANENT DAMAGE WILL OCCUR TO THE SYSTEM IF EITHER THE RF OR DC CABLES ARE NOT CONNECTED PROPERLY BETWEEN HF1 AND HF2. IT IS RECOMMENDED THAT HF1 CABLES BE COLOR CODED RED AND HF2 CABLES BE COLOR CODED GREEN.

Several operating mode options are available for the KHF 1050 HF system to meet particular operational needs.

USB (upper sideband A3J) AME (amplitude modulation equivalent A3H) are standard modes of operation permitted on all system configurations.

LSB (lower sideband A3J) operation is not permitted for stations operating under Part 87 FCC (USA) regulations. LSB may be enabled for use in regions or applications where its use is authorized.

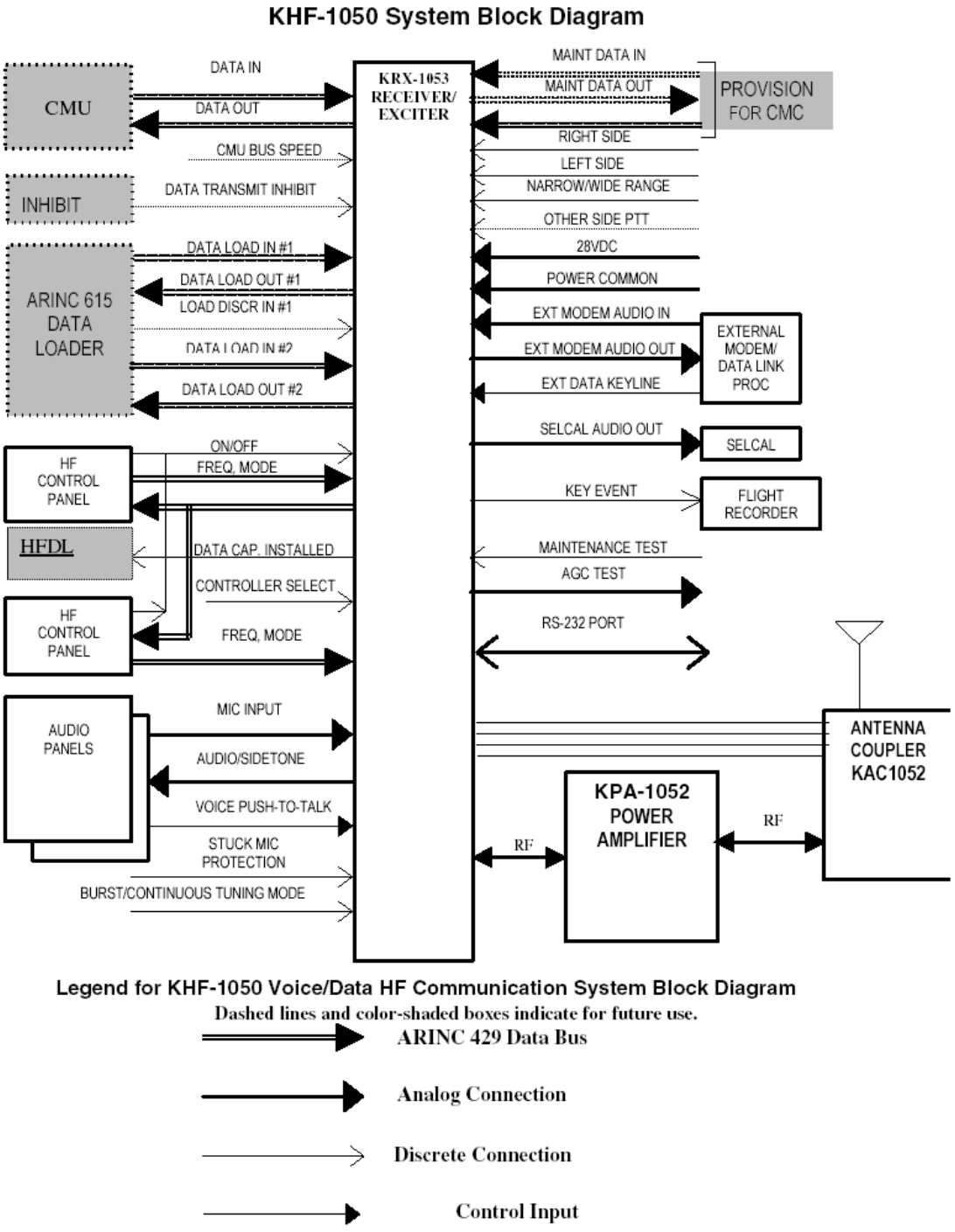
A seldom used mode A3A (USB reduced carrier) if available for use in locations that may utilize the mode.

Table 23, Modes of Operation, lists the modes of operation applicable to the PS440, MCDU, and RM-855 controllers.

The system is capable of operating in a channel (frequency preset) mode or a direct frequency mode. A microcomputer within the system provides the following functions:

- controls the non-volatile storage of frequency, mode and channel data
- controls a multiplexed eight-digit frequency display
- provides synthesizer serial data tuning information
- provides tune and transmit mode control logic
- provides band switching information
- preset antenna tune
- built-in test with fault display

Dashed lines and shaded boxes in the block diagram, Figure 5, indicate for future use.



Typical System Block Diagram
Figure 5

This version of the block diagram does not attempt to show the interconnectins between the receiver/exciter, the power amplifier, and the antenna coupler.

This version of the block diagram corresponds to the content of Technical Specification Rev C, January, 2002.

1.B. System Component Descriptions

The required and optional equipment of a KHF 1050 HF Communication System is listed below:

- KAC 1052 Antenna Coupler (required)
- KPA 1052 Power Amplifier (required)
- KRX 1053 Receiver/Exciter (required)
- Compatible HF Control Display Unit (required)
- Mounting Tray Hardware (optional)

1.B.(1) KAC 1052 Antenna Coupler (P/N 064-01074-0001)

Under microprocessor control, the KAC 1052 antenna coupler selects tuning network configurations, impedance transformations and binary capacitance and inductance to produce a VSWR of 2.5:1 or less upon initial tune. The VSWR may then deteriorate to 3:1 before the coupler will retune when transmit is next initiated.

1.B.(2) KPA 1052 Power Amplifier (P/N 064-01072-0101)

The KPA 1052 is a high frequency power amplifier. From 2.0 to 29.999MHz, the power amplifier is capable of linear amplification of a 0dBm signal to a 200 Watt output level at 50 ohms input and output impedance.

1.B.(3) KRX 1053 Receiver/Exciter (P/N 064-01073-0101)

The KRX 1053 is a high frequency receiver/exciter that is designed to operate from 2.0 to 29.999MHz synthesized in 100Hz steps. The unit will operate Amplitude Modulation Equivalent, Upper and Lower Sideband modes and Required-Carrier mode.

1.B.(4) Gables PS440 Control Display Unit
(P/N 071-01605-0101, -0201, -1101, -1201, -2101)

The PS440 stand-alone HF COMM Control Panel is designed to provide control of a single or dual HF COMM radio system. Full operational control of the HF system is accomplished via a dedicated low speed, digital ARINC 429 bus.

1.B.(5) MCDU Multfunction Control and Display Unit
(P/N 7025725-901, -910, -920, -930, -940)

This multi-function radio controller provides control of all the functions of the KHF 1050 system via ARINC 429. Frequency, channel, squelch type and level, emission type and power level are selected from the MCDU.

1.B.(6) RM-855 Radio Management Unit
(P/N 7013270-967/968)

The RM-855 displays frequency, mode and maintenance information. Via the ARINC 429 bus it provides frequency, channel, transmitter power and squelch level selection. It also has fault monitoring and fault annunciation.

1.C. Component Installation Kits

COMMENTARY: THE FOLLOWING INSTALLATION KIT INFORMATION IS PRELIMINARY, PENDING CHANGE ORDER RELEASE.

1.C.(1) KAC 1052 Antenna Coupler Installation Kits

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG 99C/U	EA	1
030-01157-0011	SOCKET CRMP 20G	EA	37
030-03517-0004	CONN, D-SUB, RECPT, CRMP, HOOD, 37 POS	EA	1
047-06261-0036	GROUND STRAP	EA	1
057-05944-0027	VERT TSO KIT LABEL, KAC 1052	EA	1
071-00200-0000	VERT TRAY ASSEMBLY KAC 1052	EA	1

KAC 1052 Single Vertical Installation Kit
(P/N:050-03658-0000)
Table 1

Part Number	Description	UM	Qty
057-05944-0034	VERT TSO KIT LABEL, KAC 1052	EA	1
071-00200-0000	VERT TRAY ASSEMBLY, KAC 1052	EA	1

KAC 1052 Single Vertical Installation Kit (tray only)
(P/N:050-03658-0001)
Table 2

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG 88C/U	EA	1
030-01157-0011	SOCKET CRMP 20G	EA	37
030-03517-0004	CONN, D-SUB, RECPT, CRMP, HOOD,37 POS	EA	1
057-05944-0036	TSO KIT LABEL	EA	1

KAC 1052 Single Vertical Install Kit (connectors only)
(P/N:050-03658-0002)
Table 3

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG 88C/U	EA	1
030-01157-0011	SOCKET CRMP 20G	EA	37
030-03517-0004	CONN, D-SUB, RECPT, CRMP, HOOD,37 POS	EA	1
047-06261-0036	GROUND STRAP	EA	1
047-12728-0001	KAC 1052 GROUND STRAP	EA	1
057-05944-0029	HORIZ TSO KIT LABEL, KAC 1052	EA	1
071-00202-0000	HORIZ TRAY ASSEMBLY, KAC 1052	EA	1
155-02988-0015	HN CABLE	EA	1

KAC 1052 Single Horizontal Installation Kit
(P/N:050-03660-0000)
Table 4

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG 88C/U	EA	2
030-01157-0011	SOCKET CRMP 20G	EA	74
030-03517-0004	CONN, D-SUB, RECPT, CRMP, HOOD, 37 POS	EA	2
047-06261-0036	GROUND STRAP	EA	2
057-05944-0030	DUAL VERT KAC 1052 TSO KIT LABEL	EA	1
071-00200-0000	VERT TRAY ASSEMBLY KAC 1052	EA	2

KAC 1052 Dual Vertical Installation Kit
(P/N:050-03661-0000)
Table 5

Part Number	Description	UM	Qty
057-05944-0035	DUAL VERT TSO KIT LABEL, KAC 1052	EA	1
071-00200-0000	VERT TRAY ASSEMBLY, KAC 1052	EA	2

KAC 1052 Dual Vertical Installation Kit (tray only)
(P/N:050-03661-0001)
Table 6

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG 88C/U	EA	2
030-01157-0011	SOCKET CRMP 20G	EA	74
030-03517-0004	CONN, D-SUB, RECPT, CRMP, HOOD,37 POS	EA	2
057-05944-0039	TSO KIT LABEL	EA	1

KAC 1052 Dual Vertical Installation Kit (connectors only)
(P/N:050-03661-0002)
Table 7

1.C.(2) KPA 1052 Power Amplifier Installation Kits

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG 88C/U	EA	2
030-01157-0011	SOCKET CRMP 20G	EA	25
030-01466-0002	CONN, D-SUB, CONTACT, CRMP, PWR, SIZE 8	EA	2
030-03516-0001	CONN, D-SUB, RECPT, COMBO-27W2, CRMP	EA	1
057-05944-0022	TSO KIT LABEL	EA	1
071-00185-0000	TRAY ASSEMBLY	EA	1

KPA 1052 Single Horizontal Installation Kit
(P/N:050-03629-0000)
Table 8

Part Number	Description	UM	Qty
057-05944-0033	KSO KIT LABEL, KPA 1052	EA	1
071-00185-0000	TRAY ASSEMBLY	EA	1

KPA 1052 Installation Kit (tray only)
(P/N:050-03629-0001)
Table 9

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG88C/U	EA	2
030-01157-0011	SOCKET CRMP 20G	EA	25
030-01466-0002	CONN, D-SUB, ACCESSORY, CONTACT, CRMP, PWR	EA	2
030-03516-0001	CONN, D-SUB, RECPT, COMBO - 27W2, CRIMP, HOOD, V-LOC	EA	1
057-05944-0037	TSO KIT LABEL	EA	1

KPA 1052 Installation Kit (connectors only)
(P/N:050-03629-0002)
Table 10

1.C.(3) KRX 1053 Receiver/Exciter Installation Kits

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG 88C/U	EA	1
030-01451-0000	CONTACT SOCKET	EA	104
030-03518-0001	CONN, D-SUB, RECPT, HI-DENS, W/HOOD, 104 POS	EA	1
057-05944-0021	TSO KIT LABEL	EA	1
071-00184-0000	TRAY ASSEMBLY	EA	1

KRX 1053 Installation Kit
(P/N 050-03628-0000)
Table 11

Part Number	Description	UM	Qty
057-05944-0032	TSO KIT LABEL	EA	1
071-00184-0000	TRAY ASSEMBLY	EA	1

KRX 1053 Installation Kit (tray only)
P/N 050-03628-0001
Table 12

Part Number	Description	UM	Qty
030-00005-0000	CONN BNC UG88C/U	EA	1
030-01466-0001	CONN D-SUB,ACCESSORY, CONTACT 22AWG, CRMP, FEMALE	EA	104
030-03518-0001	CON, D-SUB, ACCESSORY, HOOD, 104 POS	EA	1
057-05944-0038	TSO KIT LABEL	EA	1

KRX 1053 Installation Kit (connectors only)
P/N 050-03628-0002
Table 13

Part Number	Description	UM	Qty
3280	VERTICAL FIN ANCHOR KIT	EA	1
5 ARM 200-6LV	VERTICAL FIN “V” TENSION KIT	EA	1
50 ARM 300-205	ANTI-PRECIPITATION ANTENNA WIRE	FT	45
25 ARM 300-20E 30°	FEED-THROUGH INSULATOR	EA	1
50 ARM 300-250	WIRE RELEASE TOOL	EA	1
FORM #101	INSTALLATION INSTRUCTIONS	EA	1
16390	FEED-THROUGH ASSEMBLY	EA	1

Long-Wire Antenna Installation Kit
(P/N:071-01214-0001)
Table 14

1.D. Equipment Required But Not Supplied

Equipment Required But Not Supplied	
AIRCRAFT EQUIPMENT	DESCRIPTION
Power 28 Vdc	Primary power source.
Lighting Bus 5 Vac, 5 Vdc or 28 Vdc	Panel lighting power source for control units, according to version installed.
Microphone	Noise cancelling, 150 ohms nominal, pre-amplified.
Headphones	Approx. 600 ohms.
Selective Calling Decoder	AVTGA Required if SELCAL operation is desired.
Ground Strap	047-06261-0036 36” length
Long Wire HF Antenna	Long Wire HF Antenna Kit available as P/N 071-01214-0000.

Equipment Required But Not Supplied	
AIRCRAFT EQUIPMENT	DESCRIPTION
Grounded Tranline	Grounded tranline: Towel bar with 1 inch diameter recommended. Contact: Trivec-Avant Corp. 17831 Jamestown Ln. Huntington Beach, CA 92647 714-841-4976
WIRE:	Available as:
RG 400	Double shielded coax P/N 024-00075-0000
RG 142B/U	Double shielded coax P/N 024-00002-0000
24 AWG	Single conductor P/N 025-00029-0009
20 AWG	Single conductor P/N 025-00031-0000
16 AWG	Single conductor P/N 025-00031-0003
24 AWG	Single conductor with shield and jacket P/N 025-05018-0000
18 AWG	Single conductor with shield and jacket P/N 025-05019-0000
24 AWG	Two conductor with shield and jacket P/N 025-05020-0000
24 AWG	Three conductor with shield and jacket P/N 025-05023-0000
CABLE:	
AN-22a	755 Nominal Circular Mil Area* 0.090 inches Max. Overall Diameter 16.45 ohms Max. per 1000 feet @ 20°C 8 amps Max. Cont. Current Rating** 5 amps Max. Cont. Current Rating***
AN-20	1,200 Nominal Circular Mil Area* 0.100 inches Max. Overall Diameter 10.25 ohms Max. per 1000 feet @ 20°C 11 amps Max. Cont. Current Rating** 7.5 amps Max. Cont. Current Rating***

Equipment Required But Not Supplied	
AIRCRAFT EQUIPMENT	DESCRIPTION
AN-18	1,909 Nominal Circular Mil Area* 0.115 inches Max. Overall Diameter 6.44 ohms Max. per 1000 feet @ 20°C 16 amps Max. Cont. Current Rating** 10 amps Max. Cont. Current Rating***
AN-16	2,409 Nominal Circular Mil Area 0.130 inches Max. Overall Diameter 4.76 ohms Max. per 1000 feet @ 20°C 22 amps Max. Cont. Current Rating** 13 amps Max. Cont. Current Rating***
AN-14	3,830 Nominal Circular Mil Area 0.150 inches Max. Overall Diameter 2.99 ohms Max. per 1000 feet @ 20°C 32 amps Max. Cont. Current Rating** 17 amps Max. Cont. Current Rating***
AN-12	6,088 Nominal Circular Mil Area 0.170 inches Max. Overall Diameter 1.88 ohms Max. per 1000 feet @ 20°C 41 amps Max. Cont. Current Rating** 23 amps Max. Cont. Current Rating***
High Voltage HN Cables:	
155-02988-2215	Designed for single 1050 installation. Length is 15” 38.1 cm). Both connectors are straight.
155-02989-0001	Designed for dual 1050 installation. Total length is 16” (40.64 cm). Common leg is 6” (15.24 cm). Each separate leg is 10” (25.4 cm). All three connectors are straight.
155-02988-0121	Designed for single 1050 installaton. 21” (53.34 cm) length center, both connectors right angle, 180 degree indexing (one connector up, one down).

Equipment Required But Not Supplied	
AIRCRAFT EQUIPMENT	DESCRIPTION
155-02988-0015	Designed for single 1050 installation. Length is 15” (38.1 cm). Both connectors are right angle with the same orientation.
Miscellaneous	installation hardware mounting brackets wire cables nuts bolts

Equipment Required But Not Supplied
Table 15

WARNING: THE HIGH VOLTAGE HN CABLES ARE SPECIFICALLY DESIGNED TO WITHSTAND THE HIGH VOLTAGE GENERATED BY THE KHF 1050 SYSTEM. THEY CAN NOT BE REPLACED BY CABLES THAT HAVE NOT BEEN TESTED TO THESE HIGH VOLTAGES AT ALTITUDE. THESE CABLES SHOULD BE PURCHASED DIRECTLY FROM HONEYWELL, OR FROM THE QUALIFIED VENDOR (CANTON CONNECTOR CORP, 26 WAPPING ROAD, KINGSTON, MA, 02364, 781-585-4315).

1.E. Related Publications

Part Number	Description
006-15640-0000	KAC 1052 Antenna Coupler Maintenance Manual
006-15641-0000	KPA 1052 Power Amplifier Maintenance Manual
006-15642-0000	KRX 1053 Receiver/Exciter Maintenance Manual
006-15655-0000	PS440 Control Display Unit Maintenance Manual
A09-3642	MCDU Multfunction Control and Display Unit Mainenance Manual
????	RM-855 Radio Management Unit Maintenance Manual

Related Publications
Table 16

NOTE: An Aircraft Station License is required for KHF 1050 HF system equipment. Forms (FCC Form 404, New Aircraft Station License, or FCC 405A, Renewal of Aircraft Station License) can be obtained from the nearest FCC Field Office.

2. Component Configurations

System component configurations are listed in this section. The overall configuration of a KHF 1050 HF system is dependent on the component versions installed in the aircraft.

2.A. KAC 1052 Antenna Coupler Unit Configurations

PART NUMBER	VERSION	DESCRIPTON
064-01074	-0101	Antenna Coupler - standard

KAC 1052 Configurations
Table 17

2.B. KPA 1052 Power Amplifier Configurations

PART NUMBER	VERSION	DESCRIPTION
064-01072	-0101	Power Amplifier - standard

KPA 1052 Configurations
Table 18

2.C. KRX 1053 Receiver/Exciter Configurations

PART NUMBER	VERSION	DESCRIPTION
064-01073	-0101	Receiver/Exciter - standard

KRX 1053 Configurations
Table 19

2.D. PS440 Control Display Unit Configurations

PART NUMBER	VERSION	BEZEL	LCD BACKLIGHTING
071-01605	-0101	Gray	White
071-01605	-0201	Black	White
071-01605	-1101	Gray	Amber
071-01605	-1201	Black	Amber
071-01605	-2101	Gray	NVIS
071-01605	-2201	Black	NVIS

PS440 Configurations
Table 20

2.E. MCDU Multfunction Control and Display Unit Configurations

PART NUMBER	VERSION	USER
7025725	-901	Hawker Horizon
7025725	-910	Planeview GV, Cessna Sovereign
7025725	-920	(no user at present)
7025725	-930	Embraer ERJ 170
7025725	-940	Agusta AB139

MCDU Configurations
Table 21

2.F. RM-855 Radio Management Unit Configurations

PART NUMBER	VERSION	FEATURES	BEZEL
7013270	-967	Radio Management Unit - HF	Gray
7013270	-968	Radio Management Unit - HF	Black

RM-855 Configurations
Table 22

3. System Leading Particulars

3.A. General Specifications

The KHF 1050 HF System is a solid state design with 200 watts PEP of output power, supplied by 28 VDC, with an operational frequency range of 2.0 to 29.9999 MHz with 100kHz resolution. The KHF 1050 HF System has been type accepted by the FCC and TSO approved.

3.B. System Operating Modes

3.B.(1) Emission Modes

Several operating mode options are available for the KHF 1050 HF system to meet particular operational needs.

USB (upper sideband, A3J) AME (amplitude modulation equivalent A3H) are standard modes of operation permitted on all system configurations.

LSB (lower sideband, A3J) operation is not permitted for stations operating under Part 87 FCC (USA) regulations. LSB may be enabled for use in regions or applications where its use is authorized.

AM or AME (amplitude modulation equivalent, A3H) may be used in some areas that lack single-sideband (SSB) capabilities. AME is a form of amplitude modulation that is more efficient than full AM, yet compatible with AM systems.

USB Data and LSB Data are the same as the above-mentioned USB and LSB modes, except receiver audio and transmitter audio are connectedto a data-modem rather than to a speaker or microphone.

A seldom used mode A3A (USB reduced carrier) is available for use in locations that may utilize the mode.

Table 25, Modes of Operation, lists the modes of operation applicable to the PS440, MCDU and RM-855.

MODE OF OPERATION DESIGNATOR			CONTROL UNIT DESIGNATOR		
TECHNICAL		ALTERNATE	PS440	MCDU	RM-855
OLD	NEW				
A3H	H3E	AME AM Equivalent	AM	AM	AM
A3A	R3E	AM Reduced Carrier	RC	RC	
A3J	J3E	USB Upper Sideband	UV	UV	UV
A3J	J3E	LSB Lower Sideband	LV	LV	LV
A7J	J2D	USB Data Upper Sideband Data	UD	UD	UD
A7J	J2D	LSB Data Lower Sideband Data	LD	LD	LD
	H2D	AM Data Amplitude Modulation Data	AM	AM	AM

Modes of Operation
Table 23

3.B.(2) 23 MHz Limit Mode

The KHF 1050 HF system can be strapped to limit the frequency of operation to an upper limit of 22.9999 MHz for certification in countries that may require such an upper frequency limit.

3.B.(3) Channel Mode

When operating in the channel mode the KHF 1050 HF system can operate as a simplex, semi-simplex, or receive only communication system. Transmit and receive frequencies are selected by selecting a pre-programmed channel.

3.B.(4) Direct Frequency Mode

When operating in the direct frequency mode the KHF 1050 HF system can operate as a simple communication system only. Transmit and receive frequency is determined by the selected frequency, which is entered directly on the control unit.

3.B.(5) Data Mode

When the KRX 1053 Receiver/Exciter is operating in the DATA mode, interface with data modems or secure voice systems is enabled. The external modem inputs and external modem outputs are available to bypass squelch and compression functions in the KRX 1053. These levels are controlled by field adjustments.

A 4 dB variation is possible in the audio response when operating in the data mode.

Audio modulation from the modem is applied to the EXTERNAL MODEM AUDIO INPUT. When the DATA KEYLINE is grounded, the transmitter modulation is derived from the DATA AUDIO INPUT rather than from the microphone.

3.B.(6) SELCAL Mode

NOTE: SELCAL mode requires a SELCAL decoder, not supplied.

SELCAL (SELective CALling) may be used to relieve background noises during flight. The volume may be turned down completely while the system maintains a watch for a SELCAL coded audio signal.
When a decoded SELCAL signal is received, a call waiting is indicated. The SELCAL decoder generates an audio alert for the crew.

The SELCAL AUDIO OUTPUT is connected to the external SELCAL decoder. Regardless of the operating mode selected by the pilot, the SELCAL AUDIO OUTPUT is derived from an AM receiver inside the KRX 1053.

3.C. Component Leading Particulars

Leading particulars for components of the KHF 1050 HF system are listed below.

3.C.(1) KAC 1052 Antenna Coupler, Leading Particulars

CHARACTERISTIC	DESCRIPTION
Weight:	Refer to Figure 2028 (P/N 155-01774-2028)
Dimensions:	Refer to Figure2028 (P/N 155-01774-2028)
Connector:	Refer to figure 2009 (J10521) and table 2001.

KAC 1052 Leading Particulars
Table 24

3.C.(2) KPA 1052 Power Amplifier, Leading Particulars

CHARACTERISTIC	DESCRIPTION
Weight:	Refer to figure2031 (P/N 155-01450-0000)
Dimensions:	Refer to figure2031 (P/N 155-01450-0000)
Connector:	Refer to figure 2010 (J10524) and table 2002.

KPA 1052 Leading Particulars
Table 25

3.C.(3) KRX 1053 Receiver/Exciter, Leading Particulars

CHARACTERISTIC	DESCRIPTION
Weight:	Refer to Figure 2032 (P/N 155-01751-0000)
Dimensions:	Refer to Figure 2032 (P/N 155-01751-0000)
Connector:	Refer to figure 2011 (J10531) and table 2003.

KRX 1053 Leading Particulars
Table 26

3.C.(4) PS440 Control Display Unit, Leading Particulars

NOTE: Refer to the PS440 Control Display Unit Component Maintenance Manual P/N 006-15655-XXXX for more description of the PS440.

CHARACTERISTIC	DESCRIPTION
Weight:	Refer to Figure 2022 (P/N ???)
Dimensions:	Refer to Figure 2022 (P/N ???)
Connector:	Refer to figure 2011 (J1) and table 2004.

PS440 Leading Particulars
Table 27

3.C.(5) MCDU Multifuction Control and Display Unit, Leading Particulars

NOTE: Refer to the MCDU Multifunction Control and Display Unit Maintenance Manual P/N A09-3642 for more description of the MCDU.

CHARACTERISTIC	DESCRIPTION
Weight:	Refer to figure 2023 (P/N 7025726-930)
Dimensions:	Refer to figure 2023 (P/N 7025726-930)
Connector:	Refer to figure 2016 (J???) and table 2007.

MCDU Leading Particulars
Table 28

3.C.(6) RM-855 Radio Management Unit, Leading Particulars

NOTE: Refer to the RM-855 Radio Management Unit Component Maintenance Manual P/N ??? for more description of the RM-855.

CHARACTERISTIC	DESCRIPTION
Weight:	Refer to figure 2026 (P/N 7013270)
Dimensions:	Refer to figure 2026 (P/N 7013270)
Connector:	Refer to figure 2016 (J???) and table 2007.

RM-855 Leading Particulars
Table 29

4. System Function

4.A. System Functional Overview

The KHF 1050 HF Communication System supports a wide variety of communication requirements. The major components of the KHF 1050 HF system are listed below:

- KAC 1052 Antenna Coupler
- KPA 1052 Power Amplifier
- KRX 1053 Receiver/Exciter
- Compatible Control Display Unit

The basic KHF 1050 HF system is a mobile communication system for aircraft. It operates in a frequency range between 2.0 and 29.9999 MHz offering several different emission modes to provide voice communication.

By including the appropriate components in an installation, the KHF 1050 HF system capabilities can be increased to allow the system to support Data, SELCAL, and Secure Voice communication.

4.A.(1) System Power UP

COMMENTARY: INSERT POWER-UP DESCRIPTION HERE.

4.A.(2) Channel Operation

COMMENTARY: INSERT CHANNEL OPERATION DESCRIPTION HERE.

4.A.(3) Direct Frequency Mode

COMMENTARY: INSERT DIRECT FREQUENCY MODE OPERATION HERE.

4.B. Dual System

COMMENTARY: INSERT ANY DUAL SYSTEM FUNCTIONALITY INFO HERE.

5. Component Functions

5.A. PS440 Control Display Unit Unit Function

See Pilots Guide P/N 006-18289-0000 for PS440 Control Display Unit operation.

5.B. MCDU Multfunction Control and Display Unit Function

See Pilots Guide P/N XXXX for MCDU Multfunction Control and Display Unit operation.

5.C. RM-855 Radio Management Unit Function

See Pilots Guide P/N XXXX for RM-855 Radio Management Unit operation.

6. System Inputs/Outputs

6.A. Input/Output Signals

See Paragraph 5.C.(5) in the Installation and Maintenance section of this book.

TESTING AND FAULT ISOLATION

1. Fault Isolation

   Fault isolation locates the source of system failure at the black box or aircraft wiring level. Fault isolation is typically performed on the ground in response to failures indicated during post-installation checkout, preflight testing, or flight operation.

   Perform the System Performance Check (Paragraph 2.) and refer to the Fault Isolation Checklist (Paragraph 3.) for fault isolation in the KHF 1050 HF system.

2. System Performance Check

   The system check detects problems in the installation that may cause the HF system to fail, to degrade performance, or cause damage to the HF system, such as:

   - Intermittent or improperly connected cables or connectors.
   - Defective units.
   - Poorly regulated aircraft DC power.
   - Poor grounding of KHF 1050 HF system or poor aircraft bonding.
   - Audio ground loops.
   - RF interference.

   CAUTION: POWER CARTS MAY REGULATE POORLY WHEN SUBJECTED TO STRONG RF FIELDS. IF MORE THAN 20% FLUCTUATIONS IN POWER CART VOLTAGES ARE NOTED WHEN TRANSMITTING, DO NOT CONTINUE TESTING WITH POWER CART.

   CAUTION: SOME INTERMITTENT CONDITIONS MAY CAUSE OUTPUT TRANSISTORS TO FAIL, THEREFORE TRANSMIT ONLY AFTER OTHER CHECKS HAVE SUCCESSFULLY COMPLETED.

   Perform the steps in the stated sequence.

2.A. Preliminary Check

1. Prior to turning the system on, ensure that all connectors are properly seated in their proper location.

2. Turn the system on. As the system turns on it performs a brief self-test.

   Normally, after a few seconds, the HF controller (or HF window of a multi-function controller) will show an HF operating frequency, mode of operation and other operating parameters. Refer to the operating manual for the specific controller for specific operation and the information available on the display.

3. Push the TEST button on the controller to perform a system test. The pilot-activated self-test takes approximately 15 seconds to complete.

4. KXR 1053 Receiver/Exciter Built-In-Test

   The receiver/exciter design incorporates provisions for monitoring its own operation to detect any condition or occurrence that the operator (a flight crew member) might observe and interpret as a reason for requesting a maintenance action.

   These maintenance observations are stored in non-volatile memory within the receiver/exciter so they can be retrieved with appropriate test equipment.

   If a sufficiently serious fault is detected, the “receiver/exciter status” bit of the Maintenance Status message, label 351, is set to indicate a fault.

   The maintenance data collection provision includes the following three types of monitoring: Power-On, Continuous Monitoring and Initiated Tests. The BITE tests that shall be performed at system turn-on, at pilot activated, or continuously are summarized in Table 1001. The table shows which tests are performed for each of the three types of monitoring.

FUNCTION	TURN ON	PILOT	CONT	Label 351
Discrete Line Check	X			29
Flash ROM Checksum	X			29
DSP ROM	X	X		29
DSP RAM	X	X		29
DSP CLOCK (60MHz)	X	X		29
RF Board XMT Operation	X	X		29
RF Board RCV Operation	X	X		29
RF Board DSP Clock (60MHz)	X	X		29
15V Power Line	X		X	29
9V Power Line	X		X	29
3.3V Power Line	X		X	29
PRIMARY Power Fail (28V Power Line Voltage)	X	X	X	29
Rx/Ex Internal Temperature	X			29
PA OK/NG	X	X	X	18
ACP OK/NG	X	X	X	28
Rx/Ex - CPLR Serial Communication	X	X		29
ACP WARN			X	15
ACP Tune Fail			X	28 Note 1

RX/EX BITE Matrix
Table 1001

5. KPA 1052 Power Amplifier Built-In-Test

The power amplifier design incorporates provisions for monitoring its own operation to detect any condition or occurrence that the operator (a flight crew member) might observe and interpret as a reason for requesting a maintenance action.

The maintenance data collection provision includes the following three types of monitoring: Power-On Test, Conditions Monitoring and Initiated test, as defined below.

PA Alarm 1 - This alarm will be generated whenever the SWR at the input to the antenna coupler is too high. The antenna coupler will try to retune to lower SWR during transmit mode.

PA Alarm 2 - This alarm will be generated whenever an invalid band error request occurs, a higher than normal SWR within the PA is generated, a higher than normal output power occurs, an over-temperature condition exists, or the PA has no output power. This alarm inhibits all transmissions.

The BITE tests that shall be performed at system turn-on, at pilot activated or continuously are summarized in Table 1002.

FUNCTION	POWER ON	PILOT	CONT	Label 351 Bit Note 1
Load SWR (PA ALM#1) During Tx Only			X	18
Temperature (PA ALM#2)			X	18
Transmitter Power at 50 W (With KAC 1052 in the system)	X	X		18
Note1: PA ALM#1 and PA ALM#2 are sent to the KAC 1052 with discrete lines. The KAC 1052 then sends the PA Alarm data to the KRX 1053. Label 351 information is actually sent by the KRX 1053.				

PA BITE Matrix
Table 1002

6. KAC 1052 Antenna Coupler Built-In-Test

The antenna coupler design incorporates provisions for monitoring its own operation to detect any condition or occurrence that the operator (a flight crew member) might observe and interpret as a reason for requesting a maintenance action.

These maintenance observations are stored in non-volatile memory within the antenna coupler so they can be retrieved with appropriate test equipment.

If the maintenance observation is serious enough to indicate Antenna Coupler failure, the failure shall be communicated to the receiver/exciter for reporting to the HF controller.

The BITE tests that shall be performed at system turn-on, at pilot activation or continuously are summarized in Table 1003.

FUNCTION	POWER ON	PILOT	CONT	Label 351 Bit Note 1
Internal memory		X		28
12V Power Line				28
5V Power Line		X		28
Bridge amplifier output voltage		X		28
Low pressure alarm signal (PRESS ALM)		X	X	15
Leak pressure warning level (Temp, Press)		X	X	15 & 28
RF power level and Power Sensor		X		28
PA alarm #1 signal (PA ALM#1) During Tx Only		X	X	18
PA alarm #2 signal (PA ALM#2)		X	X	18
VSWR sensor		X		28

Impedance sensors		X		28
Note 1: The Label 351 information is actually sent by the KRX 1053 in response to RS-422 serial data sent by the KAC 1052 to the KRX 1053.				

Antenna Coupler BITE Matrix
TablE 1003

7. In the event that a problem is detected during either the turn-on test or the pilot-activated self-test, an error message will appear on the controller. The error message may indicate a failure of one or more of the following:

   - Controller
   - Receiver/Exciter
   - Power Amplifier
   - Antenna Coupler

   Refer to Section 3, Fault Isolation Checklist.

2.B. Receiver Performance Check

1. If an operating frequency is properly displayed on the controller, listen to the speaker or headphones. Ensure that the aircraft audio panel is properly set to select the HP audio.

2. Select the USB Voice (UV) mode, SBH type squelch. (SBH is the default squelch type. If using an RM855, only the SB type is available.) Adjust the squelch level to OFF. Adjust the volume control on the PS440 controller, and/or the volume control on the audio panel. Depending on the frequency or channel selected, a signal may be heard - or perhaps just atmospheric static.

   NOTE: If the aircraft is located in a metal hangar, both signals and noise may be weak. It is advisable to have the aircraft outside the hangar to perform the receiver or transmitter tests.

   Select a channel with a known usable signal. One possibility is one of the time-and-frequency standard stations operating on frequencies of 2500.0 MHz, 5000.0 MHz, 10000.0 kHz, 15000.0 kHz or 20000.0 kHz.

These stations are located in Fort Collins, Colorado and Kekaha, Hawaii. Consult the HF frequency propagation chart in Table 2001 for an overview of the frequency to use for a particular time of day and distance from the transmitter. These stations transmit in the AM mode. However, they can be received by the KHF 1050 System in the USB Voice (UV), LSB Voice (LV), AM or Reduce-Carrier (RC) modes.

If a signal can not be heard,check the connetion to the antenna, the antenna itself and ensure that all coaxial cables that interconnect the KHF 1050 System are properly connected.

4. Adjust the squelch level as needed to LOW, MED or MAX to achieve the minimum level required to suppress the receiver noise with no signal present.

2.C. Transmitter Performance Check

1. Select the HF positon on the audio panel microphone switch.

   CAUTION: VERIFY THAT NO ONE IS STANDING ON THE GROUND NEAR THE AIRCRAFT OR TOUCHING THE AIRCRAFT. WITH MANY TYPES OF AIRCRAFT HF ANTENNAS, THE ENTIRE AIRFRAME BECOMES PART OF THE ANTENNA. ANYONE STANDING ON THE GROUND COULD RECEIVE AN ELECTRICAL SHOCK IF TOUCHING THE AIRCRAFT, OR IF ENTERING OR EXITING THE AIRCRAFT DURING A TRANSMISSION BY THE KHF 1050 SYSTEM. DO NOT OPERATE THE HF SYSTEM WHILE THE AIRCRAFT IS BEING FUELED.

2. Select a channel on which the aircraft is authorized to transmit, with the apropriate mode of operation, which is typically USB Voice (UV). Momentarily press the PTT switch to start the antenna tuing process.
   Assuming the KAC 1052 Antenna Coupler has not previously been on this frequency, the antenna coupler will begin to tune to the antenna and the controller display will begin to indicate that tuning is taking place. Refer to the controller information for the details of how tuning is annunciated by the particular controller being used.

In the event that the operating frequency selected had previously been tuned by the KAC 1052 Antenna Coupler, the antenna coupler will utilize stored tune information and match to the antenna in less than 50msec. However, changes in antenna impedance can occasionally result in the KAC 1052 needing to retune on a previously tuned frequency.

3. Upon completion of the tune cycle, the tune indication will disappear and the display will return to a normal recieve window. The receiver audio will likely be stronger than it was prior to tuning the antenna and it may be necessary to readjust the squelch if there is significant noise on the channel. The system is now ready to transmit voice communications.

4. In order to ensure good audio quality of the transmitted signal, a microphone-ground-loop test is recommended. To check for microphone ground loops, select the AM mode on an unused frequency. Key the system with no modulation, preferably covering the microphone element with your hand.

   Listen for any squeal or popping sound in the speaker or headphones. A squeal or popping sound tends to indicate that a microphone ground loop exists. Microphone ground loops will result in distorted audio. Such a ground loop is usually the result of the microphone audio low line being tied to airframe ground at multiple points.

5. Listen to the sidetone in the headphones or speaker while transmitting, both in USB Voice (UV) and in AM. A raspy sound may indicate that RF interference is feeding back into the HF or audio system.

6. While transmitting a voice test message in USB Voice (UV), observe other electrical equipment in the aircraft and note any interference observed that correlates to the HF transmission.

7. Voice communications should be established with a ground station or another aircraft. See Section 7.B.(4)(b).

3. Fault Isolation Checklist

FAULT	ACTION
Turn-On or Pilot-Activated Self-Test Fault:	1. Check the connections to each unit having an associated error condition. Verify that 28 VDC power is being 2. applied to each unit and that the voltage is steady. 3. Ensure the integrity of each coaxial cable in the system and verify that each is connected to the proper connectors.
Tuning Fault:	1. Press PTT switch to retune antenna. 2. If unit fails to retune, select a different frequency and try to retune the antenna at the new frequency. 3. Turn the KHF 1050 system off and check the coaxial cable connections between the KAC 1052 and the antenna feedpoint. 4. Ensure that there is no evidence of arcing in the connectors, antenna feed-through insulator or at the antenna. 5. Check the antenna. If it is a grounded antenna, verify that the DC resistance to ground is very low. If it is an open wire antenna, verify that the resistance to ground is very high. Refer to the bonding information in Section 6A.
Contact Honewell Product Support for further assistance.	

Fault Isolation Checklist
Table 1004

INSTALLATION AND MAINTENANCE

1. General Coverage

This section provides service personnel with installation and maintenance information pertaining to the following KHF 1050 HF Communication System components:

- KAC 1052 Antenna Coupler
- KPA 1052 Power Amplifier
- KRX 1053 Receiver/Exciter

NOTE: For installation and maintenance information on the Gables PS440 refer to the PS440 Control Display Unit Installation Manual P/N 006-10655-XXXX.

For installation and maintenance information on the MCDU Multifunction Control and Display Unit refer to the MCDU Installation Manual P/N XXXX.

For installation and maintenance information on the RM-855 Radio Management Unit refer to the RM-855 Installation Manual P/N XXXX.

2. Unpacking

Use care when unpacking KHF 1050 HF system components. Open shipping cartons and carefully remove all items. Check that all items on the packing list are included. Visually inspect each component for damage incurred during shipment: dents, deep abrasions, chipped paint, etc. If any component is damaged, notify the transportation carrier immediately.

3. Pre-installation Testing

All components of the KHF 1050 HF system have been adjusted and tested before shipment and pre-installation testing is not required. If pre-installation bench testing of any unit is desired, refer to bench test section of the applicable maintenance manual. Refer to DESCRIPTION AND OPERATION, section 1.F., for a list of related maintenance manuals.

4. Equipment Changes and Markings

A standardized marking system identifies equipment with incorporated modifications. Refer to the Publication Index for a list of Service Bulletins affecting the various units in the KHF 1050 HF system.

5. Installation Planning

5.A General Considerations

General information for installation of the KHF 1050 HF system, instructions for location of system components, interwiring and cable fabrication, and mode strapping options are provided in the following paragraphs. Interconnect diagrams at the end of this section show the interconnection of various system components.

The KHF 1050 HF system should be installed in the aircraft in a manner consistent with acceptable workmanship and engineering practices and according to instructions set forth in this publication.

The installer should make a thorough visual inspection and perform the post-installation and operational checks of the system to ensure that the system has been properly and safely installed in the aircraft.

CAUTION: AFTER INSTALLATION OF THE CABLING AND BEFORE INSTALLATION OF THE EQUIPMENT, SUPPLY AIRCRAFT PRIMARY POWER TO THE CABLES AND CHECK THAT POWER IS APPLIED ONLY TO THE UNIT CONNECTOR PINS SPECIFIED IN THE INTERWIRING DIAGRAMS.

5.B. Location of Equipment

5.B.(1) KAC 1052 Antenna Coupler Mounting Location

Refer to Figure 2028 for mounting dimensions.

The location of the KAC 1052 Antenna Coupler is critical. It must be located very close to the feedpoint of the antenna or the antenna feed-through insulator. In order to maximize the efficiency of the HF system, it is desireable to keep the length of the feedline less than 12 inches, if possible. The feedline should not exceed 24 inches, including the connector length.

NOTE: Due to the high level of RF voltage the KHF 1050 system is capable of generating, only a specially fabricated Honeywell feedline may be used. Refer to Section 1.C.(1) for appropriate part numbers.

The KAC 1052 must be mounted in a location that will allow it to be well bonded to the airframe. See Section 6A for bonding considerations.

For best reliability, the KAC 1052 should be mounted such that it is not subjected to excessive vibration or heat.

The KAC 1052 can be mounted to either vertically or horizontally on a horizontal surface.

5.B.(2) KPA 1052 Power Amplifier Mounting Location

Refer to Figure 2031 for mounting dimensions.

The location of the KPA 1052 is generally not critical. It is recommended that it be mounted near the KAC 1052, to minimize loss in the coaxial cable interconnecting the KPA 1052 and the KAC 1052.

The cable length between the KPA 1052 and the KAC 1052 should not exceed 50 feet.

For best reliability, the KAC 1052 should be mounted such that it is not subjected to excessive vibration or heat.

The KAC 1052 can be mounted to either a vertical or horizontal surface.

5.B.(3) KRX 1053 Receiver/Exciter Mounting Location

Refer to Figure 2032 for mounting dimensions.

Mount the KRX 1053 so that the connection between the KRX 1053 and the KAC 1052 does not exceed 50 feet. The KRX 1053 is typically mounted vertically on a horizontal surface.

5.B.(4) Control Display Unit Mounting Location

Refer to Figures 2022, 2023 and 2026 for mounting dimensions.

Refer to the installation manual for the PS440 Control Display Unit, P/N 006-10655-XXXX, for PS440 mounting instructions.

Refer to the installation manual for the MCDU, P/N XXXX, for MCDU mounting instructions.

Refer to the installation manual for the RM-855, P/N XXXX, for RM-855 mounting instructions.

5.B.(5) Antenna Location

The antenna is a primary factor for maximum performance of the KHF 1050 HF system. While numerous options are available in the choice of antenna configurations, some configurations are better suited for a particular installation than others. Commonly used aircraft HF antennas will generally fall into one of four categories:

- "V" (Referring to the V shape formed by the antenna wire) and Long wire antenna.
- Short grounded wire antenna.
- Shunt antenna.

Characteristics of these commonly used antennas and the compromise associated with each type are described below, so the installer can select the antenna that is best suited to a particular aircraft and type of operation. All antennas should be installed in a manner that does not jeopardize the safe operation of the aircraft.

5.B.(6)(a) "V" and Long Wire Antenna Mounting Location

Because of their generally good performance, consideration should be given to the use of "V" and long wire antennas on all installations, except very high speed fixed wing aircraft and helicopters. Wire antennas are not recommended for use on helicopters, due to safety concerns in the event of an antenna wire breakage.

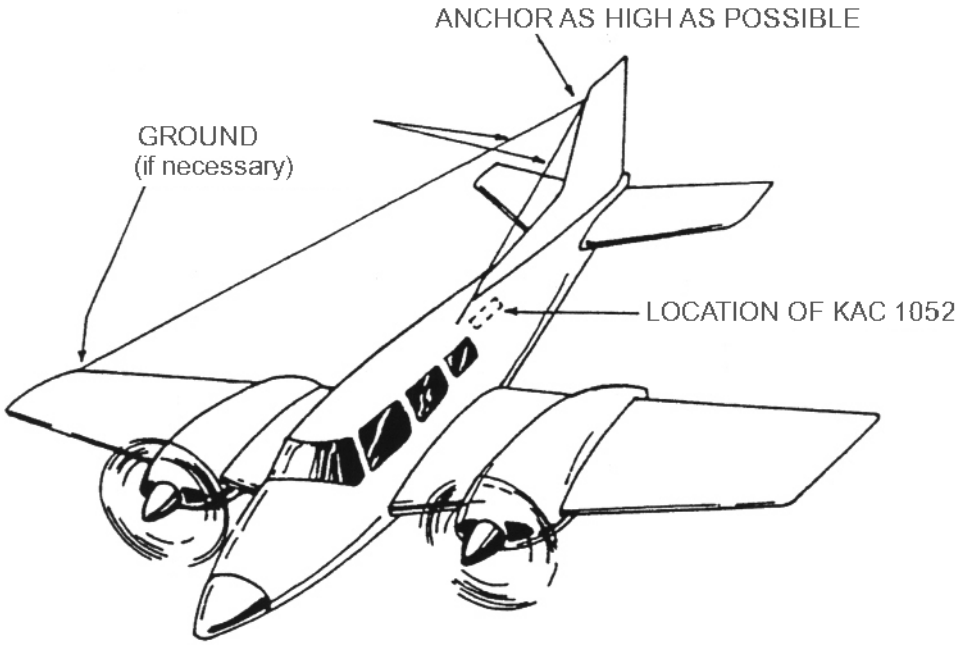
"V" and long wire antenna performance will be enhanced by striving to meet the following criteria:

- Maximize the length of wire (up to approximately 60 feet or 18 m.). The total length of the antenna should be at least 25 feet (7.6 m).

- Maximize the separation between the antenna wire and the aircraft structure. This is usually achieved by attaching the tensioner as high as possible on vertical stabilizers.

5.B.(6)(a)1 Wing Tip “V” Antenna Mounting Location

The wing type “V” is one of the most effective HF antennas which can be utilized on an aircraft. It is well suited for slow and moderate speed aircraft which require optimum HF communication and performance. It will exhibit a rather omnidirectional radiation pattern and provide good efficiency at all frequencies. It has the disadvantages of having high drag, and on low wing aircraft is prone to being walked into. The length of a wing tip “V” antenna is usually 30 to 45 feet (9.2 to 13.7 m).

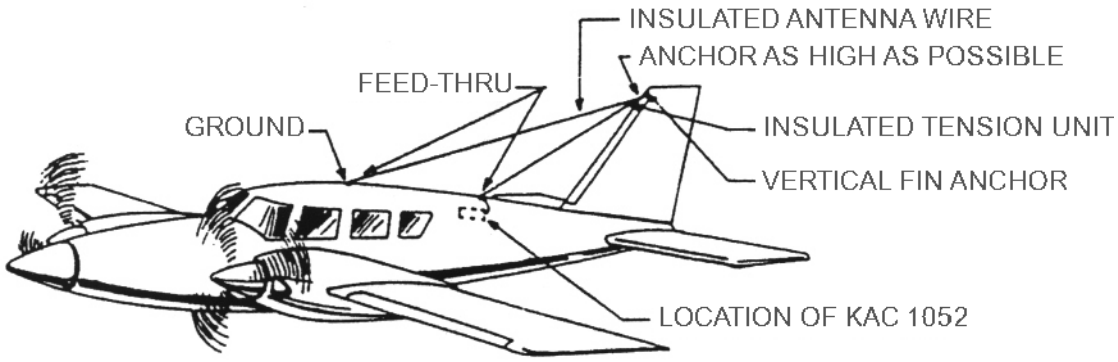


Typical Wing Tip “V” Antenna
Figure 2001

5.B.(6)(a)2 Inverted “V” Antenna Mounting Location

The inverted “V” antenna is recommended when a wing “V” is not practical and the antenna coupler is to be mounted in the aft position of the aircraft. The inverted “V” antenna will produce maximum signal strength off the side of the aircraft and will produce a moderate amount of drag.

The vertical fin anchor should be located as high as possible on the vertical stabilizer. The feedthru insulator should be located approximately 3 feet (0.9 m) forward of the base of the vertical stabilizers and near the centerline of the top of the aircraft.



Typical Inverted “V” Antenna
Figure 2002

5.B.(6)(b) Long Wire Antenna Mounting Location

The long wire antenna is used when the KAC 1052 Antenna Coupler is located in the forward part of the aircraft. It will provide maximum signal radiation off the sides of the aircraft. Significant nulls in signal strength may be noted off the nose and tail of the aircraft.

Typical Long Wire Antenna
Figure 2003

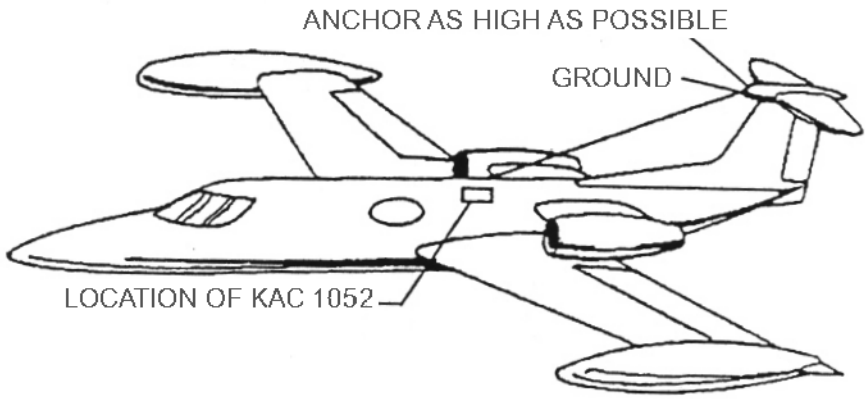
5.B.(6)(c) Short Grounded Wire Antenna Mounting Location

Short grounded wire antennas may be utilized on higher speed and/or high altitude aircraft. These short wire antennas have a minimum drag and do not develop as high of RF voltages as do the longer wire antennas, making them suitable for operations up to 55,000 feet. However the efficiency of the short antenna will be lower, especially at the low frequencies.

Typical short wire antenna lengths are approximately 8 feet (2.4 m) to 18 feet (5.5 m). The large antenna currents require the use of a wire with low RF resistance (i.e., large diameter and highly conductive surface) to reduce the power losses in the wire. The feedline and the antenna grounding must have very low RF resistance. Only a tensioner with an attached ground wire should be used to terminate the antenna.

5.B.(6)(c)1 Short Wire to Vertical Stabilizer Antenna Mounting Location

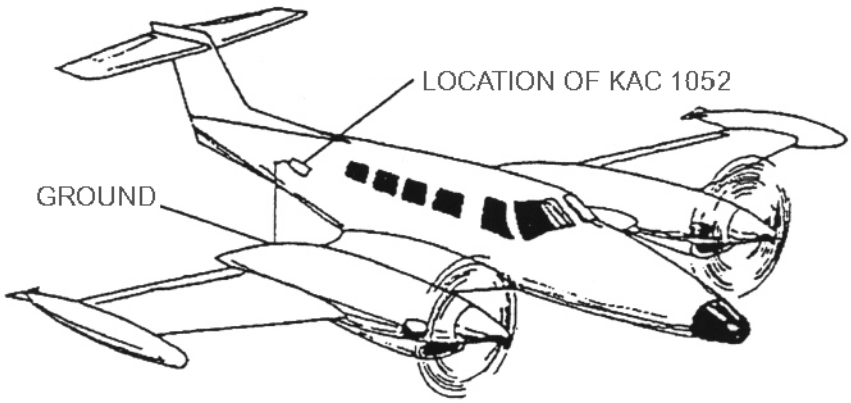
The most common form of short grounded wire antennas ahve the feedthru insulator mounted on the upper aft part of the fuselage, as far forward of the vertical stabilizer as is practical. The antenna wire runs from this feedthru to the tip of the vertical stabilizer. It is important to ground this wire as high as possible on the vertical stabilizer to maximize the efficiency and to reduce the nulls in the pattern. This antenna will generally exhibit maximum radiation off the side of the aircraft.



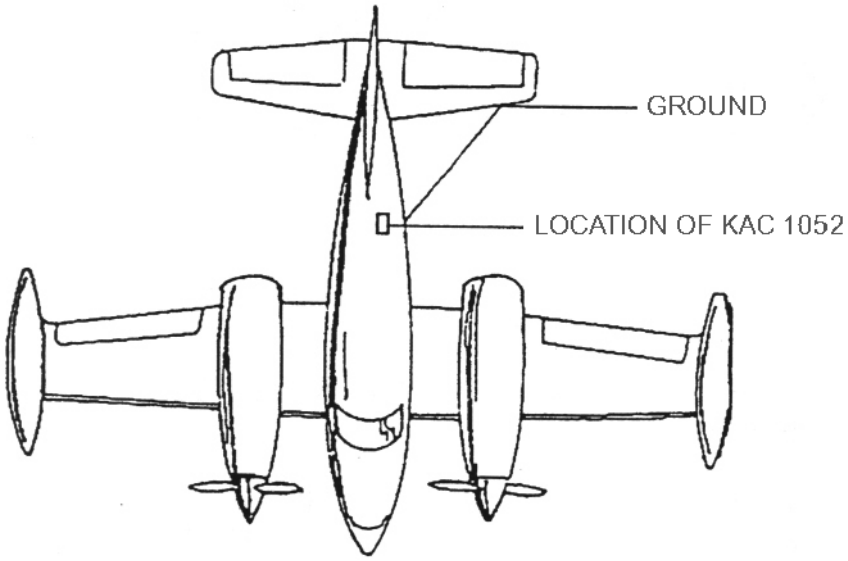
Typical Short Wire to Vertical Stabilizer Antenna
Figure 2004

5.B.(6)(c)2 Short Wire to Wing or Horizontal Stabilizer Antenna Mounting Location

In installations where the short wire to the vertical stabilizer may not be practical, consideration may be given to a short grounded wire to the wing or horizontal stabilizer. While such antennas produce only minimum drag, they will tend to be directional off the side of the aircraft. These antennas are also prone to being walked into. Maximum separation between the wire and the aircraft structure is important, as is maximizing the length of the wire.



Typical Short Wire to Wing Antenna
Figure 2005



Typical Short Wire to Horizontal Stabilizer Antenna
Figure 2006

5.B.(6)(d) Shunt Antenna Mounting Location

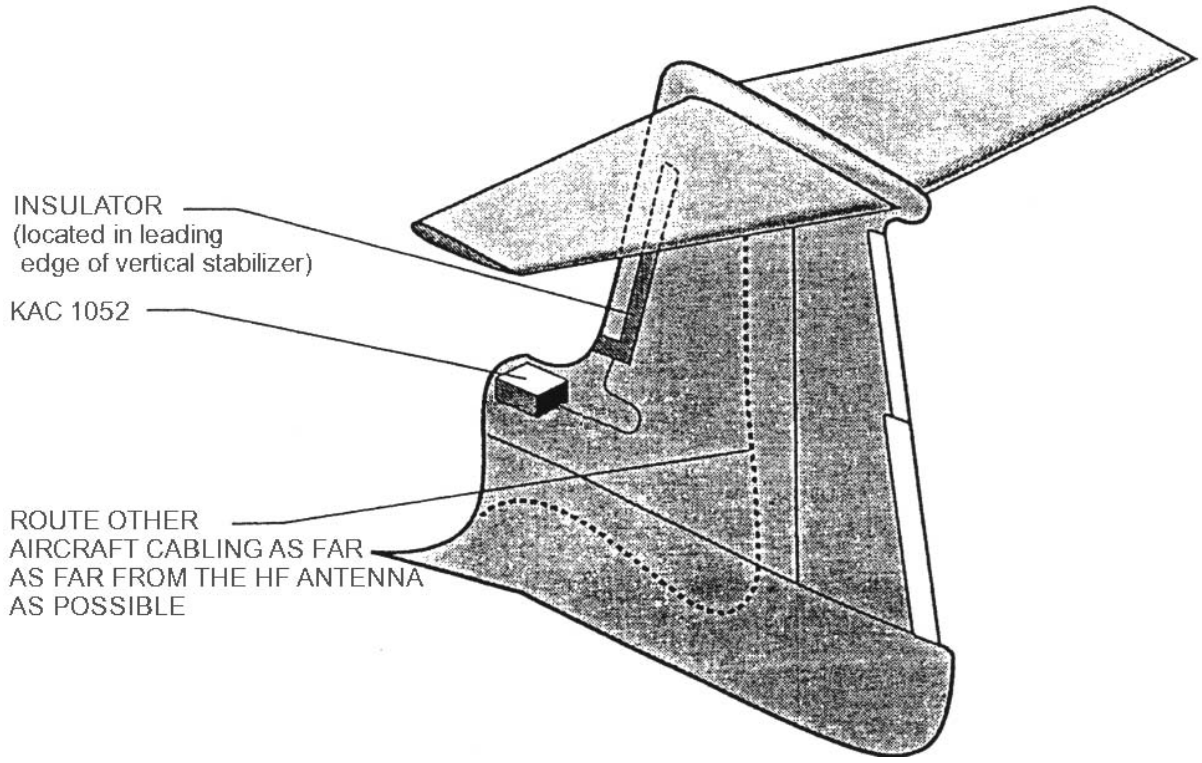
Two types of shunt antennas are commonly used. The most preferable type, on a fixed wing aircraft, is designed by the airframe manufacturer as a part of the airframe structure. It is most often an electrically isolated section of the leading edge of the vertical stabilizer, grounded at the top. The other type of shunt antenna is often referred to as a "tranline" or "towel bar", which is simply a rod or tube run external to a section of the airframe and grounded.

Shunt antennas are suitable for high altitude aircraft because they do not develop extremely high voltage but do not develop extremely high RF current (up to 50 amps).

5.B.(6)(d)1 Leading Edge of Vertical Stabilizer Antenna Mounting Location

A shunt antenna that is built into the leading edge of the vertical stabilizers has become popular on many jet aircraft. Such an antenna provides no drag, exhibits a rather omnidirectional radiation pattern and if well bonded can provide moderate to good efficiencies. Good bonding of the antenna and the KAC 1052 Antenna Coupler is essential.

A large diameter feedline exhibiting extremely low RF resistance must be used between the KAC 1052 Antenna Coupler and the antenna.



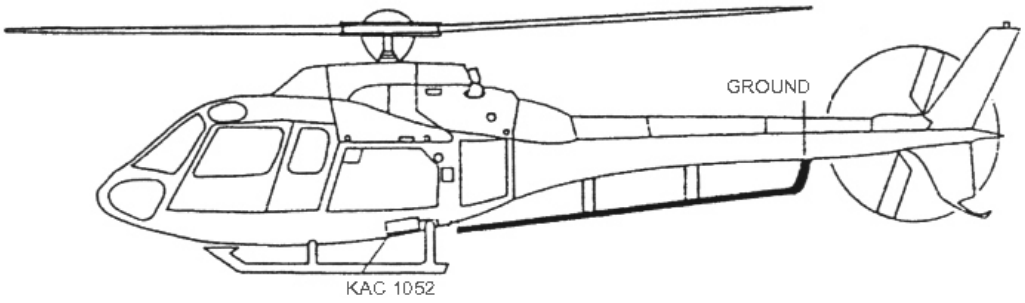
Typical Shunt Leading Edge Antenna
Figure 2007

5.B.(6)(d)2 Shorted Tranline or Towel Bar Antenna Mounting Location

Grounded transline (transmission line), often referred to as “towel bar” antennas because their shape resembles a towel bar, are best suited for helicopter applications. They can be attached parallel to the tailboom and fed on the forward end. These antennas provide minimum drag but suffer from poor efficiencies, especially at low frequencies. Loss with this type of antenna can be minimized by observing the following criteria:

- Space the antenna as far off the airframe as possible. 18 inches (0.46 m) is preferred, with spacing of less than 9 inches (23 cm) being acceptable.

- The antenna diameter should be a minimum of 1 inch (2.54 cm) and constructed out of a highly conductive material. Copper or aluminum is generally used, with silver plating being recommended. Stainless steel should be avoided due to its high resistance. This antenna should be a continuous piece (non-spliced) and should be well bonded at both ends.
- A minimum antenna length of 12 feet (3.7 m) should be used. The feedline coax length should be limited to 6 inches (15 cm).
- It is preferable to attach the antenna to a protruding surface, such as a tail boom or a stabilizer element. Attaching to a wide section of the fuselage will generally give poor performance.



Typical Shorted Tranline or Towel Bar Antenna
Figure 2008

5.C. Interwiring and Cable Fabrication

5.C.(1) Fabrication and Routing

Figure 2033 provides a KHF 1050 HF Communication System interconnect summary.

Cabling must be fabricated according to the interwiring diagrams. The length of the wires to parallel pins should be approximately the same length, for best current distribution.

Wires for optional functions are shown on the interwiring diagrams. The actual use of these wires will depend upon the installation, customer requirements and capability of the units installed.

When the cables are installed in the aircraft, they must be supported firmly enough to prevent movement and should be carefully protected against chafing. Additional protection should also be provided in all locations where the cables may be subject to abuse.

In wire bundles, the cabling should not be tied tightly together as this tends to increase the possibility of noise pickup and similar interference. When routing cables through the airframe, the cables should cross high-level lines at a right angle.

Wiring harness and antenna cable should be routed in such a manner that they do not adversely affect the operation of the shock mounts.

The installer must be knowledgeable of any system variation peculiar to the installation such as strapping requirements described in section 5.D. Furthermore, the installer should use ARINC Characteristic 735 as a guide and reference throughout the fabrication and installation of the cabling in the aircraft.

5.C.(2) Interface Capability and Requirements

All RF coaxes must be double shielded.

In systems that employ speech processing, special care should be taken in the routing of the microphone input line. This line is susceptible to noise. It should not be routed in the same harness containing high current lines.

5.C.(3) Primary Power and Circuit Breaker Requirements

All units in the KHF 1050 system should be protected by circuit breakers in the positive primary power lines. The KPA 1052 should use an individually dedicated 30 amp slow-acting circuit breaker. The KAC 1052 and KRX 1053 can share a common 5 amp circuit breaker, or be individually protected by 5 amp circuit breakers for each. If a PS440 controller is used in the system, it can share a circuit breaker with the KRX 1053. An MCDU or an RM-855 must not share a circuit breaker with any HF system component.

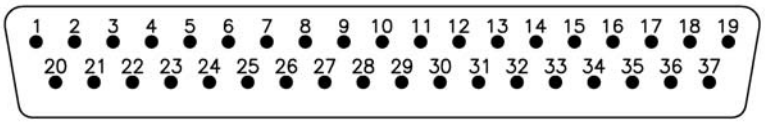
5.C.(4) Antenna Cable Type

The cable connecting the KAC 1052 antenna output (J10528) to the antenna or antenna feed-through must be a specially fabricated feedline supplied by Honeywell. Due to the high level of RF voltage the KHF 1050 system is capable of generating, substitute cables must not be used. Refer to Section 1.C.(1) for appropriate part numbers for the Honeywell supplied HN-to-HN feedline assemblies.

5.C.(5) Connectors

Mating connectors for the KHF 1050 HF system components are identified on the appropriate outline drawing. Associated connector installation kits are specified in DESCRIPTION AND OPERATION section of this manual. Crimping, insertion, extraction tools are identified in section 5.C.(6).

5.C.(5)(a) KAC 1052 Antenna Coupler Connector



KAC 1052 Antenna Coupler Connector (J10521) Pin Configuration
Figure 2009

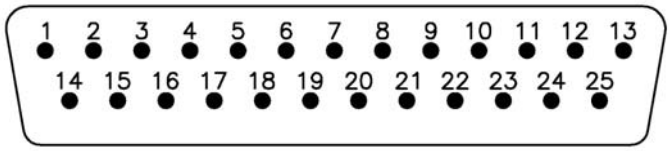
KAC 1052 CONNECTOR PIN DEFINITIONS		
PIN	SIGNAL NAME	DESCRIPTION
1	PRI PWR RTN	PRIMARY POWER RETURN
2	PWR CONT RTN	POWER ON/OFF CONTROL RETURN
3	STRP A	STRAP A
4	STRP COM	STRAP COMMON
6	RCA	CPLR TXD BUS +
7	CRA	CPLR RXD BUS +
8	BUS COM	BUS COMMON
9	EXCTR INHB +	EXCTR INHIBITION +

KAC 1052 CONNECTOR PIN DEFINITIONS		
PIN	SIGNAL NAME	DESCRIPTION
10	TUN FAIL +	TUNE FAIL +
11	RC COM	PHOTO-COUPLER COMMON SOURCE
12	EXCTR TUN REQ -	EXCTR TUNE REQUEST -
13	FG	FRAME GROUND
14	APC H	APC HIGH
15	PA INHB+	PA INHIBITION +
16	PA SI	PA SERIAL DATA
17	PA SCK	PA SERIAL CLOCK
18	PA RCK	PA SERIAL STROBE
19	PA RST	PA RESET
20	+27.5V PRI PWR	+27.5 VDC PRIMARY POWER
21	PWR CONT	POWER ON/OFF CONTROL
22	STRP B	STRAP B
24	RCB	CPLR TXD BUS -
25	CRB	PHOTO-COUPLER COMMON SOURCE
26	EXCTR COM	EXCTR COMMON
27	MATCH ON -	MATCHING CIRCUIT ON -
28	BRDG ON +	BRIDGING AMPLIFIER ON +
29	CR COM	PHOTO-COUPLER COMMON SOURCE
30	BFRD KEY -	BUFFERED KEY -
31	FG	FRAME GROUND
32	CP COM	PHOTO-COUPLER COMMON SOURCE
33	PA BFRD KEY -	PA BUFFERED KEY -
34	PA ALM + #1	PA ALARM + #1
35	PA ALM + #2	PA ALARM + #2
36	PC COM	PHOTO-COUPLER COMMON SOURCE

KAC 1052 CONNECTOR PIN DEFINITIONS		
PIN	SIGNAL NAME	DESCRIPTION
37	APC L	APC LOW

KAC 1052 Antenna Coupler Connector (J10521) Pin Definitions
Table 2001

5.C.(5)(b) KPA 1052 Power Amplifier Connector



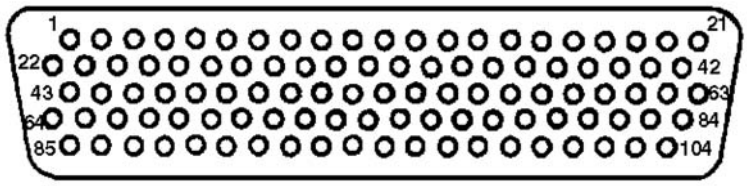
KPA 1052 Power Amplifier Connector (J10524) Pin Configuration
Figure 2010

KPA 1052 CONNECTOR PIN DEFINITIONS		
PIN	SIGNAL NAME	DESCRIPTION
A1	+27.5V PRI PWR	+27.5 VDC PRIMARY POWER
A2	PRI PWR RTN	PRIMARY POWER RETURN
4	FG	FRAME GROUND
5	PA SI	PA SERIAL DATA
6	PA RCK	PA SERIAL STROBE
7	PA ALM + #1	PA ALARM + #1
8	PA RST	PA RESET
9	APC H	APC HIGH
10	APCL	APC LOW
11	PWR CONT RTN	POWER ON/OFF CONTROL RETURN
17	CP COM	PHOTO-COUPLER COMMON SOURCE
18	PA SCK	PA SERIAL CLOCK
19	PA INHB+	PA INHIBITIION +

KPA 1052 CONNECTOR PIN DEFINITIONS		
PIN	SIGNAL NAME	DESCRIPTION
20	PA ALM + #2	PA ALARM + #2
21	PC COM	PHOTO-COUPLER COMMON SOURCE
22	PA BFRD KEY -	PA BUFFERED KEY -
23	PWR CONT	POWER ON/OFF CONTROL

KPA 1052 Power Amplifier Connector (J10524) Pin Definitions
Table 2002

5.C.(5)(c) KRX 1053 Receiver/Exciter Connector



KRX 1053 Receiver/Exciter Connector (J10531) Pin Configuration
Figure 2011

KRX 1053 CONNECTOR PIN DEFINITIONS			
PIN	SIGNAL NAME	I/O	DESCRIPTION
1	PWR CONT RTN	I	POWER ON/OFF CONTROL RETURN
2	A615 DATA LDR INP#2(A)	I	A615 DATA LOADER INPUT #2 (A)
3	A615 DATA LDR OUT#2(A)	O	A615 DATA LOADER OUTPUT #2 (A)
4	CMU OUT(A)	O	CMU OUTPUT (A)
5	CMC INP(A)	I	CMC INPUT (A)
6	CMC OUT(A)	O	CMC OUTPUT (A)
7	A615 DATA LDR OUT#1(A)	O	A615 DATA LOADER #1 (A)
8	HF CONT INP #2(A)	I	HF CONTROLLER INPUT #2(A)

KRX 1053 CONNECTOR PIN DEFINITIONS			
PIN	SIGNAL NAME	I/O	DESCRIPTION
9	HF CONT INP #1(A)	I	HF CONTROLLER INPUT #1(A)
10	SPARE		
11	RCB	O	CPLR RXD BUS -
12	BUFFERED KEY	O	BUFFERED KEY -
13	KEY EVENT	O	KEY EVENT
14	EXCTR TUNE REQUEST -	I	EXCTR TUNE REQUEST -
15	TUNE MODE	I	CONTINUOUS/BURST TUNING MODE
16	VO PTT H	I	VOICE PUSH-TO-TALK HIGH
17	SW LD#1	I	SOFTWARE LOAD #1
18	AGC TEST	O	AGC TEST
19	SELCAL AUD H	I	SELCAL AUDIO HIGH
20	EXT MODEM AUD H	O	EXTERNAL MODEM AUDIO HIGH
21	MIC AUD H	I	MIC AUDIO HIGH
22	+27.5V PRI PWR	I	+27.5 VDC PRIMARY POWER
23	PWR CONT	I	POWER ON/OFF CONTROL
24	A615 DATA LDR OUT#2(B)	O	A615 DATA LOADER OUTPUT #2 (B)
25	CMU INP(A)	I	CMU INPUT (A)
26	GENL PRP BUS INP(A)	I	GENERAL PURPOSE BUS INPUT (A)
27	CMC OUT(B)	O	CMC OUTPUT (B)
28	A615 DATA LDR INP#1(A)	I	A615 DATA LOADER INPUT #1 (A)
29	HF TUNE/M STAT(A)	O	HF TUNING/MODE STATUS (A)
30	HF CONT INP #1(B)	I	HF CONTROLLER INPUT #1 (B)
31	SPARE		
32	RCA	O	CPLR TXD BUS +
33	TXD(OUT)	O	RS232 MAINT MODE TXD BUS (OUT)
34	MATCH ON -	O	MATCHING CIRCUIT ON -

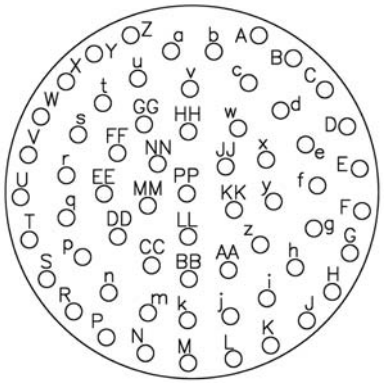
KRX 1053 CONNECTOR PIN DEFINITIONS			
PIN	SIGNAL NAME	I/O	DESCRIPTION
35	RC COM		PHOTO-COUPLER COMMON SOURCE
36	STUCK MIC PTCT	I	STUCK MIC PROTECTION
37	OTHER SIDE PTT	I	OTHER SIDE PTT
38	EXT DATA KEYLINE H	I	EXTERNAL DATA KEYLINE HIGH
39		I	
40	RCV AUD/SIDETN H	O	RECEIVE AUDIO/SIDETONE HIGH
41	EXT MODEM AUD OUT L	O	EXT MODEM AUDIO OUTPUT LOW
42	EXT MODEM AUD INP H	I	EXT MODEM AUDIO INPUT HIGH
43	+27.5V PRI PWR	I	+27.4 VDC PRIMARY POWER
44	A615 DATA LDR INP#2(B)	I	A615 DATA LOADER INPUT #2 (B)
45	CMU INP(B)	I	CMU INPUT (B)
46	CMU OUT(B)	O	CMU OUTPUT (B)
47	CMC INP(B)	I	CMC INPUT (B)
48	A615 DATA LDR INP#1(B)	I	A615 DATA LOADER INPUT #1 (B)
49	A615 DATA LDR OUT#1(B)	O	A615 DATA LOADER OUTPUT #1 (B)
50	HF CONT INP #2(B)	I	HF CONTROLLER INPUT #2 (B)
51	SPARE		
52	SPARE		
53	CRA	I	CPLR RXD BUS +
54	BRDG ON +	O	BRIDGING AMPLIFER ON +
55	EXCTR INHB +	I	EXCTR INHIBITION +
56	DATA XMT INHB	I	DATA TRANSMIT INHIBIT
57	CONT SEL	I	CONTROLLER SELECT
58	VO PTT L	I	VOICE PUSH-TO-TALK LOW
59	DATA CAPBLTY INSTL		DATA CAPABILITY INSTALLED
60	SPARE		

KRX 1053 CONNECTOR PIN DEFINITIONS			
PIN	SIGNAL NAME	I/O	DESCRIPTION
61	SELCAL AUD L	O	SELCAL AUDIO LOW
62	EXT MODEM AUD INP L	I	EXT MODEM AUDIO INPUT LOW
63	MIC AUD L	I	MIC AUDIO LOW
64	PRI PWR RTN	I	PRIMARY POWER RETURN
65	SPARE		
66	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
67	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
68	GENL PRP BUS	I	GENERAL PURPOSE BUS INPUT (B)
69	DATA BUS SHLD GND	GND	DATA BUS SHIELD GND
70	DATA BUS SHLD GND	GND	DATA BUS SHIELD GND
71	HF TUNE/M STAT(B)	O	HF TUNING/MODE STATUS (B)
72	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
73	SPARE		
74	CRB	I	CPLR RXD BUS -
75	RXD(IN)	I	RS232 MAINTENANCE MODE
76	CR COM		PHOTO-COUPLER COMMON SOURCE
77	TUN FAIL +	I	TUN FAIL +
78		I	
79	R SIDE	I	RIGHT SIDE
80	EXT DATA KEYLINE L	I	EXTERNALDATA KEYLINE LOW
81		I	
82	RCV AUD/SIDETN L	O	RECEIVE AUDIO/SIDETONE LOW
83	ANLG SHLD GND	GND	ANALOG SHIELD GROUND
84	ANLG SHLD GND	GND	ANALOG SHIELD GROUND
85	PRI PWR RTN	I	PRIMARY POWER RETURN
86	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND

KRX 1053 CONNECTOR PIN DEFINITIONS			
PIN	SIGNAL NAME	I/O	DESCRIPTION
87	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
88	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
89	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
90	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
91	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
92	DATA BUS SHLD GND	GND	DATA BUS SHIELD GROUND
93	FG	GND	FIELD GROUND
94	DATA BUS SHLD GND	GND	DATA BUS SHIELD GND
95	BUS COM	GND	BUS COMMON
96	GND	GND	GND
97	EXCTR COM	GND	EXCITER COMMON
98	L SIDE	I	LEFT SIDE
99	GND	GND	DISCRETE SIGNAL GROUND
100	NAR/W FREQ RNG	I	NARROW/WIDE FREQ RANGE
101	FG	GND	FRAME GROUND
102	ANLG SHLD GND	GND	ANALOG SHIELD GROUND
103	ANLG SHLD GND	GND	ANALOG SHIELD GROUND
104	ANLG SHLD GND	GND	ANALOG SHIELD GROUND

KRX 1053 Receiver/Exciter Connector (J10531) Pin Definitions
Table 2003

5.C.(5)(d) PS440 Control Display Unit Connector



PS440 Control Display Unit Connector (J1) Pin Configuration
Figure 2012

PS440 CONNECTOR PIN DEFINITIONS		
PIN	PIN	FUNCTION
1	A	28 VDC In
2	B	DC Ground
3	C	Chassis Ground
4	D	Spare
5	E	Reserved
6	F	Spare
7	G	Spare
8	H	Spare
9	J	Spare
10	K	Spare
11	L	Spare
12	M	AM Inhibit In
13	N	Spare
14	P	Freq Range In
15	R	Spare

PS440 CONNECTOR PIN DEFINITIONS		
PIN	PIN	FUNCTION
16	S	Spare
17	T	HF On/Off Out
18	U	Spare
19	V	ARINC 429 Out A
20	W	Spare
21	X	Reserved
22	Y	28 VDC Dimming Bus
23	Z	ARINC 429 In #1A
24	a	Test Out
25	b	Reserved
26	c	Spare
27	d	Spare
28	e	Spare
29	f	Spare
30	g	Spare
31	h	Spare
32	i	Spare
33	j	Spare
34	k	Spare
35	m	Reserved (ALE Inhibit In)
36	n	LSB Voice and Data Inhibit In
37	p	FCDE Enable In
38	q	Spare In
39	r	ARINC 429 Out B
40	s	Spare
41	t	Reserved

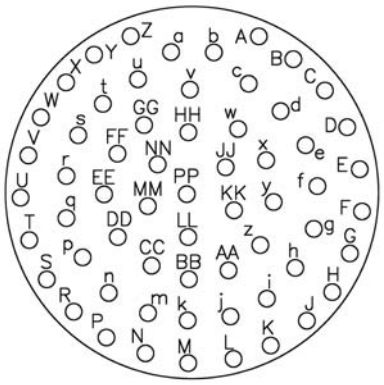
PS440 CONNECTOR PIN DEFINITIONS		
PIN	PIN	FUNCTION
42	u	ARINC 429 In #1B
43	v	Spare
44	w	Spare
45	x	Spare
46	y	Spare
47	z	Spare
48	AA	HFDL Inhibit In
49	BB	SDI Config In
50	CC	Reduced Carrier Inhibit In
51	DD	0.1 kHz Enable In
52	EE	Spare Out #1
53	FF	Spare
54	GG	5 VDC / AC Lighting High
55	HH	Spare
56	JJ	Spare
57	KK	Spare
58	LL	Spare Out #2
59	MM	HF Datalink Out
60	NN	Lighting Lo
61	PP	USB Data Inhibit In

PS440 Control Display Unit Connector (J1) Pin Definitions
Table 2004

5.C.(5)(e) MCDU Multifunction Control and Display Unit Connectors

For MCDU Multifunction Contol and Display Unit connection information, refer to Installation Manual P/N: XXXX.

5.C.(5)(f) RM-855 Radio Management Unit Connector



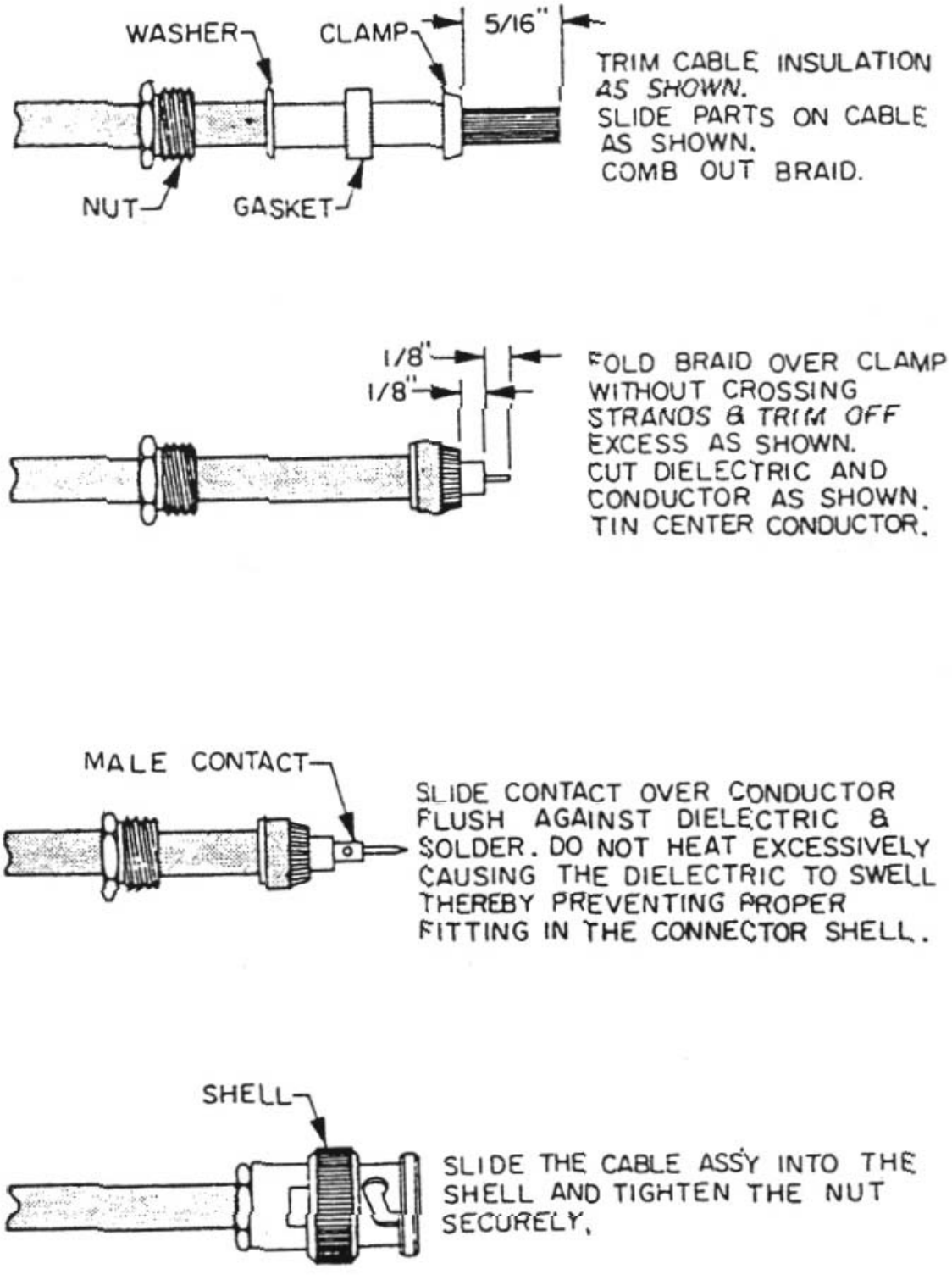
RM-855 Radio Management Unit Connector (J????) Pin Configuration
Figure 2016

RM-855 CONNECTOR PIN DEFINITIONS		
PIN	FUNCTION	CONNECT TO
X	LRU IDENT	OPEN - PILOT SIDE HF (ARINC SDI = 01B) GROUND - COPILOT SIDE HF (ARINC SDI = 10B)
e	STRAP COMMON	JUMPER TO X FOR GROUND
k	(-) 429 RXA	RMU1 429 TX
S	(+) 429 RXA	
R	(-) 429 RXB	RMU2 429 TX
P	(+) 429 RXB	
D	(-) 429 RXC	FMS 429 RX
E	(+) 429 RXC	
AA	(-) 429 TXA	HF1 - HF1 RMU 429 RX HF2 - HF2 RMU 429 RX
m	(+) 429 TXA	
CC	(-) 429 TXB	FMS 429 RX
BB	(+) 429 TXB	
r	A/B SELECT	LEAVE OPEN

RM-855 CONNECTOR PIN DEFINITIONS		
PIN	FUNCTION	CONNECT TO
s	C SELECT	LEAVE OPEN
Y	BURST ENABLE	JUMPER TO e - ARINC 429 BURST ENABLE
q	STOP SCAN	JUMPER TO u - STOP SCAN ENABLE
u	RETRANSMIT	JUMPER TO q - STOP SCAN ENABLE

RM-855 Radio Management Unit Connector (J????) Pin Definitions
Table 2007

5.C.(5)(f) BNC Connector Assembly (P/N 030-00005-0001)

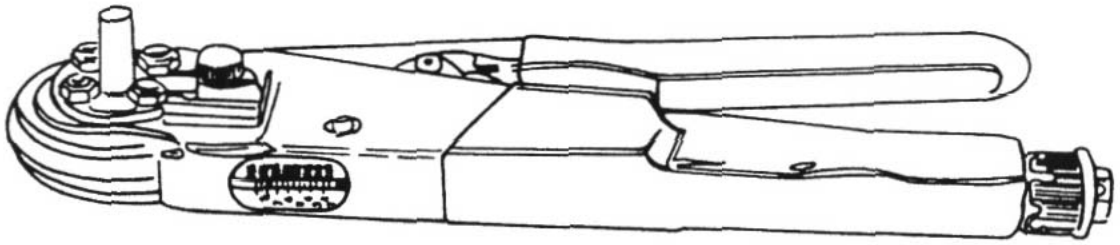


BNC Connector Assembly Procedure
Figure 2017

5.C.(6) Connector Pin Tools

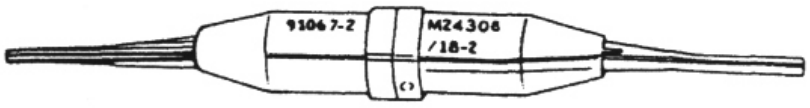
The crimping tool and associated positioner used during the fabrication of cables are identified in figure 2018.

The insertion and extraction tools used during the fabrication of cables are identified in figure 2019.



	INDUSTRIAL NUMBER
CRIMPING TOOL:	AlliedSignal P/N 005-02012-0021 BUCHANAN 612118 POSITRONIC 9507-0-0-0 DANIELS #AFM8 DAVO #300D MS3191-A
POSITIONER WIRE SIZE #20/#24:	AlliedSignal P/N 005-02012-0023 BUCHANAN 612513 POSITRONIC 9502-5-0-0 DANIELS #K13-1 DAVO (attached to #300D) P-20-3191-1

Crinping Tool
Figure 2018



Insertion/Extraction Tool: AlliedSignal P/N 005-02012-0025
AMP 91067-2
MIL M24308/18-12
ITT CANNON # CET-20-11
MS 18278-1
MS 10278
Positronics M81969\1-02

Insertion Tool (KAC 952): AlliedSignal P/N 005-02012-0015

Extraction Tool (KAC 952): AlliedSignal P/N 005-02012-0012

Insertion and Extraction Tools
Figure 2019

5.D. Strapping Options

5.D.(1) KRX 1053 Receiver/Exciter Strapping Options

Refer to Table 2008 for KRX 1053 strapping options.

5.D.(1)(a) Power ON/OFF Control - (J10531-23) PWR CONT

An external controller turns on the KRX 1053 Receiver/Exciter by asserting the POWER ON/OFF CONTROL discrete input. In an installation in which LRU power is to be controlled by a radio master switch or relay, this input may be permanently strapped to ground.

This input is continuously read.

5.D.(1)(b) Controller Select - (J10531-57) CONT SEL

When the TUNING MODE discrete input is not assorted, the CONTROLLER SELECT discrete determines which HF controller input is active.

NOTE:Asserted = GND, Not Asserted = OPEN

The KRX 1053 Reciever/Exciter accepts tuning and control data from the HF CONTROLLER INPUT #1 when the CONTROLLER SELECT and TUNING MODE discrete inputs are not asserted.

The KRX 1053 Receiver/Exciter accepts tuning and control data from the HF CONTROLLER INPUT #2 when the CONTROLLER SELECT discrete input is asserted and the TUNING MODE discrete input is not asserted.

This input is continuously read.

5.D.(1)(c) Burst/Continuous Tuning Mode - (J10531-15) TUNE MODE

When the BURST/CONTINUOUS TUNING MODE discrete input is not asserted, the KRX 1053 Receiver/Exciter operates with continuous tuning and mode control data and the CONTROLLER SELECT discrete input determines the active controller input.

When the BURST/CONTINUOUS TUNING MODE discrete input is asserted, the KRX 1053 Receiver/Exciter operates by receiving bursts of tuning data.

In a system consisting of two external HF controllers, with one controller connected to HF CONTROLLER INPUT #1 data bus and the other connected to HF CONTROLLER INPUT #2 data bus, this tuning and control mode allows the receiver/exciter to automatically accept tuning/control data bursts from either controller.

In either the BURST or CONTINUOUS mode, the receiver/exciter sends continuous data to the controller.

The KRX 1053 Receiver/Exciter processor samples the state of this discrete input only at initial power application. The state of this discrete is assumed to not change during operation.

5.D.(1)(d) Key Event - (J10531-13) KEY EVENT

The KRX 1053 Receiver/Exciter asserts the KEY EVENT discrete output when the transmitter is activated by any activation method.

This output may be used by external equipment, such as a flight recorder, to sense when the HF system is transmitting.

5.D.(1)(e) Left Side (J10531-98) L SIDE and Right Side (J10531-13)

When the LEFT SIDE discrete input is asserted and the RIGHT SIDE descrete input is not asserted, the KRX 1053 Receiver/Exciter accepts ARINC 429 data in which the SDI field is set to 10B, 00B, or 11B. (SDI field 00B identifies an “all call” message and SDI field 11B identifies a “tune both” message.)

Additionally, the KRX 1053 Receiver/Exciter sets the SDI field of all ARINC 429 transmitted messages to 01B (bit 9 = 1, bit 10 = 0). This condition identifies the system as HF #1.

When the RIGHT SIDE discrete input is asserted and the LEFT SIDE discrete input is not asserted, the KRX 1050 Receiver/Exciter accepts ARINC 429 data in which the SDI field is set to 10B, 00B, or 11B.
(SDI field 00B identifies an “all call” message and SDI field 11B identifies a “tune both” message.)

Additionally, the KRX 1053 Receiver/Exciter sets the SDI field of all ARINC 429 transmitted messages to 10B (bit 9 = 0, bit 10 = 1). This condition identifies the system as HF #2.

When neither the LEFT SIDE discrete input nor the RIGHT SIDE discrete input is asserted, or when both the LEFT SIDE and RIGHT SIDE discrete inputs are asserted:

- The KRX 1053 Receiver/Exciter does not accept ARINC 429 data.
- The KRX 1053 Receiver/Exciter sets the SDI field of all ARINC 429 transmitted messages to 00B, and it sets bits 30 and 31 (status field) of all messages except that with label 351 to 11B, indicating an invalid condition shall set bits 30 and 31 (status field) of the label 351 Maintenance Status message to 00B, indicating a fault condition. It is intended that at least one of these discrete inputs, but not both, be asserted.

The KRX 1053 Receiver/Exciter processor samples the state of these discrete inputs only at initial power application. The state of these discretes are assumed to not change during operation.

5.D.(1)(f) Narrow/Wide Freq Range - (J10531-100) NAR/W FREQ RNG

When the NARROW/WIDE FREQ RANGE discrete input is asserted, the KRX 1053 Receiver/Exciter restricts operations to the frequency range from 2.0000 MHz through 22.9999 MHz, and clears bit 18 of the Receiver/Exciter Output Label 037, Word ID #1 (Control Status) word to logic 0.

When the NARROW/WIDE FREQ RANGE discrete input is not asserted, the KRX 1053 Receiver/Exciter operates over the full frequency range from 2.0000 MHz through 29.9999 Mhz.

If the NARROW/WIDE FREQ RANGE discrete input is asserted and the HF controller commands a transmit or receive frequency below 2.0000 MHz or above 22.9999 MHz, the receiver/exciter sets bits 30 and 31 of all transmitted Frequency/Control Status words (label 037) to 11B, indicating an invalid condition.

The KRX 1053 Receiver/Exciter processor samples the state of this discrete input only at initial power application. The state of this discrete is assumed not to change during operation.

5.D.(1)(g) Maintenance Test- (J10531-78) MAINT TEST

hen the MAINTENANCE TEST discrete input is asserted, the KRX 1053 Receiver/Exciter RS-232 Maintenance port accepts test modes including the generation of a two-tone PEP test signal.

This input is continuously read.

5.D.(1)(h) Stuck MIC Protection- (J10531-36) STUCK MIC PTCT

When the STUCK MIC PROTECTION discrete input is asserted, the receiver/exciter stops transmitting after a transmission duration equal to a constant set in non-volatile memory during manufacturing test or service center test.

- This time duration can be set to a value between 30 seconds and 240 seconds. The default time is 120 seconds.
- The KRX 1053 Receiver/Exciter processor samples the state of this discrete input only at initial power application. The state of this discrete is assumed to not change during operation.

5.D.(1)(i) External Data Keyline HI (J10531-38) EXT DATA KEYLINE H

When the external resistance between the EXTERNAL DATA KEYLINE HI and LO pins is ten ohms or less, the KRX 1053 Receiver/Exciter activates the transmitter and uses the audio at the EXTERNAL MODEM AUDIO INPUT as the modulation source.

The KRX 1053 Receiver/Exciter drives a current of at least ten milliamps through any resistance of ten ohms or less between the EXTERNAL DATA KEYLINE HI and LO pins.

The EXTERNAL DATA KEYLINE LO pin may be connected externally to airframe ground in some installations.

The KRX 1053 Receiver/Exciter interprets a resistance of ten ohms or less between the EXTERNAL DATA KEYLINE HI and LO pins as a command to transmit, whether the LO pin is grounded or left floating.

This input is continuously read.

5.D.(1)(j) External Modem Audio Input High/Low- (J10531-42/62) EXT MODEM AUD INP H/L

The audio signal level is typically 0.775 VRMS across 600 ohms.

The KRX 1053 Receiver/Exciter presents a balanced, floating 600 ohm load to this signal.

This input does ot present direct-current bias to the signal source.

There is no audio clipping or compression associated with this input at levels below 1.55 VRMS when adjusted as in paragraph one above.

This input is factory adjusted so that at standard temperature and primary power voltage, a 1 kHz modem input signal of 0.775 VRMS yields full Data USB output power from the KRX 1053 Receiver/Exciter and an input of 0.39 V yields 6 dB +/-0.5 dB more output power than that obtained with 0.775 V of input signal.

5.D.(1)(k) Voice Push-To-Talk HI- (J10531-16) VO PTT H

When the external resistance between the VOICE PUSH-TO-TALK HI and LO pins is ten ohms or less, the KRX 1053 Receiver/Exciter activates the transmitter and uses the audio at the MIC AUDIO INPUT as the modulation source.

The KRX 1053 Receiver/Exciter drives a current of at least ten milliamps through any resistance of ten ohms or less between the VOICE PUSH-TO-TALK HI and LO pins.

The KRX 1053 Receiver/Exciter interprets a resistance of ten ohms or less between the VOICE PUSH-TO-TALK HI and LO pins as a command to transmit, whether the LO pin is grounded or left floating.

This input is continuously read.

NOTE: The VOICE PUSH-TO-TALK LO pin may be connected externally to airframe ground in some installations.

5.D.(1)(l) Other Side PPT- (J10531-37) OTHER SIDE PTT

When asserted, the OTHER SIDE PTT input prevents the system from transmitting.

This input is continuously read.

In a dual system installation, when this input is connected to the KEY EVENT output of the KRX 1053 Receiver/Exciter in the opposite system, it prevents this system from transmitting whenever the KEY EVENT of the other system is asserted.

When asserted, bit 18 of message (Output label 037), word ID #1 “Other side keyed” is set to 0.

The OTHER SIDE PTT and the KEY EVENT discrete inputs/outputs function as an “interlock” to ensure that both systems can not transmit at the same time. Such an interlock function is required when two HF systems share a common antenna on an aircraft.

Example: If the co-pilot is transmitting (or tuning the antenna) on the right-side HF system, the pilot will not be able to key the left-side system until the right-side system returns to the receive mode. Once the right-side system has returned to receive mode, the pilot will be able to immediately transmit (or tune the antenna) on the left-side system.

Unit/Pin	Function	Strapping	Comment
76J1-23	Power On/Off	MAU/MCDU	May be grounded for KHF 1050 System to be be always on.
76J1-15	Tuning Mode	Ground	Accepts burst ARINC 429 input.
76J1-36	Stuck MIC	TBD	Ground to limit transmission to 30 second default.
76J1-57	Controller Select	Open	N/A with Burst Tuning Control.

Unit/Pin	Function	Strapping	Comment
76J1-79	Right Side	Side Depenent	Ground if right-side system. Open if a single KHF 1050 installation.
76J1-98	Left Side	Side Dependent	Ground if left-side system. Open if a single KHF 1050 installation.
76J1-100	Narrow/Wide	Open	Allows 2.0000 to 29.9999 MHz operation.

KRX 1053 Receiver/Exciter Straps
Table 2008

Unit/Pin	Function	Strapping	Comment
76J1-16	Voice PTT	To Audio Panel	May be pulled to aircraft ground or 76J1-58.
76J1-38	External Data Keyline	Open	Used only for data transmission. May be pulled to aircraft ground or 76J1-60.
76J1-13	Key Event	Open in a single KHF 1050 installation	May also be used to suppress other equipment in the aircraft during HF transmission.
76J1-37	Other Side PTT	Open in a single KHF 1050 installation	In a dual KHF 1050 installation, connect to the keyline of the other system.

KRX 1053 Logic Inputs and Outputs
Table 2009

6. Equipment Installation

6.A Bonding Connections

6.A.(1) Antenna Coupler Bonding Connections

The importance of properly bonding the KAC 1052 Antenna Coupler to the airframe can not be over emphasized.

Good RF bonding of the KAC 1052 Antenna Coupler to the aircraft fuselage is essential in achieving maximum efficiency from the system and minimizing interference with other systems in the aircraft.

The primary bonding path is through a ground strap from a ground post on the KAC 1052 to a point on the airframe near the antenna feed point. More than one ground strap can be used. Additional grounding is achieved via the KAC 1052 mounting tray and mounting shelf. The shield of the coax also contributes to the overall bond of the KAC 1052 to the airframe.

6.A.(2) Bonding Strap Considerations

Make bonding straps as short as practical and installed in such a manner that the resistance of each connection does not exceed 0.003 ohms. The straps must not interfere with moveable aircraft elements, such as surface controls, nor should the movements of these elements result in damage to the bonding straps.

The bonding strap should be made of a solid conductive material rather than braid. Strap thickness should be 0.010 inches or greater. A one inch wide silver plated copper strap, available from Honeywell, is recommended. P/N 047-06261-0036 is a 36 inch length of the strap.

6.A.(3) Bonding Connection and Corrosion Prevention Techniques

Because the mounting surfaces are an important part of the ground system, bonding between these surfaces requires special attention.

NOTE: All nonconductive finishes such as paint, anodizing films, or zinc chromate, must be totally removed from the entire mating surface before assembly. Techniques such as spot-facing or cleaning only small area of the mating surfaces do not provide adequate RF bonding.

Ground strap connections must be totally free of any non-conductive finishes.

Corrosion resistance for aluminum mating surfaces should be achieved by cleaning the aluminum surfaces with Alumiprep #33 (P/N 016-01127-0000), and then applying Alodine #1001 (P/N 016-01128-0000). Alodine #1001 (as well as Alodine #600) provides good electrical conductivity, other Alodine coatings should be avoided.

Only after the shelves are assembled and mounted, and ground straps installed, may nonconductive or poorly conductive protective finishes, such as zinc chromate be applied. Periodic inspection should be made of all bonds to ensure that corrosion is not occurring. Any observed corrosion should be cleaned off.

6.B. KAC 1052 Antenna Coupler Installation

6.B.(1)Select a mounting location for the KAC 1052 Antenna Coupler, referring to Section 5.B.(1).

6.B.(2)Power Requirements

The KAC 1052 Antenna Coupler will operate from a 28 Vdc power supply. The unit must be connected to the aircraft power supply with a circuit breaker with not less than 25 Amp rating.

6.B.(3) Grounding Requirements

NOTE: The importance of properly bonding the KAC 1052 Antenna coupler to the airframe can not be over emphasized.

NOTE: Except for the ground provided by the feedline coax shield, bonding should not be done with braided wire but with solid conductive straps, typically one inch wide.

Good RF bonding of the KAC 1052 Antenna Coupler to the aircraft fuselage is basic in achieving maximum efficiency from the system and eliminating any possible intereference to other systems in the aircraft. See Section 6.A for bonding considerations.

6.B.(4) After a location has been selected, remove the mounting tray from the four shock mounts.

6.B.(5) Place each shock mount dead center over each center tap position.

6.B.(6) Drill four #8 holes per each shock mount.

6.B.(7) Thoroughly clean the mounting surface where the bonding straps will be attached. If the surface is aluminum, apply Alodine #1001 per Section 6.A.(1).

6.B.(8) Mount the shock mounts to the mounting surface with four each # 8-32 fasteners and lock nuts, installing the ground straps under the appropriate shock mounts.

6.B.(9) Attach the mounting tray to the four shock mounts, installing the two tray ground straps.

6.B.(10) With the mounting tray secured, locate a point on the airframe structure near the antenna feedthru for attaching a unit to airframe ground strap. Drill two #6 holes, clean and apply Alodine per section 6.A.(1). Connect a ground strap between this point and the KAC 1052 Antenna Coupler ground stud.

NOTE: This strap shold not be braided wire, but a solid strap.

6.B.11 Place the KAC 1052 Antenna Coupler unit into the mounting tray and secure it in place with two knurled knobs. Provisions for safety wire installation is provided, if desired.

6.C. KPA 1052 Power Amplifier Installation

6.C.(1)Select a mounting location for the KPA 1052 Power Amplifier, referring to Section 5.B.(2).

6.C.(2)Power Requirements

The KPA 1052 Power Amplifier will operate from a 28 Vdc power supply. The unit must be connected to the aircraft

power supply with a circuit breaker with not less than 25 Amp rating.

6.C.(3) Grounding Requirements

Except for the ground provided by the feedline coax shield, bonding should not be done with braided wire but with solid conductive straps, typically one inch wide.

6.C.(4) After a location has been selected, remove the mounting tray from the four shock mounts.

6.C.(5) Place each shock mount dead center over each center tap position.

6.C.(6) Drill four #8 holes per each shock mount.

6.C.(7) Thoroughly clean the mounting surface where the bonding straps will be attached. If the surface is aluminum, apply Alodine #1001 per Section 6.A.(1).

6.C.(8) Mount the shock mounts to the mounting surface with four each # 8-32 fasteners and lock nuts, installing the ground straps under the appropriate shock mounts.

6.C.(9) Attach the mounting tray to the four shock mounts, installing the two tray ground straps.

6.C.(10) With the mounting tray secured, locate a point on the airframe structure near the antenna feedthru for attaching a unit to airframe ground strap. Drill two #6 holes, clean and apply Alodine per section 6.A.(1). Connect a ground strap between this point and the KPA 1052 Power Amplifier.

NOTE: This strap shold not be braided wire, but a solid strap.

6.C.(11) Place the KPA 1052 Power Amplifier unit into the mounting tray and secure it in place with two knurled knobs. Provisions for safety wire installation is provided, if desired.

6.D. KRX 1053 Receiver/Exciter Installation

6.D.(1) Select a mounting location, referring to Section 5.B.(3).

6.D.(2) After a location has been selected, remove the mounting tray from the four shock mounts.

6.D.(3) With the shock mounts removed and the tray laying flat against the mounting structure, center tap four positions at which the shock mounts will mount to the tray.

6.D.(4) Place each shock mount dead center over each center tap position.

6.D.(5) Drill two #6 holes per each shock mount.

6.D.(6) Clean and Alodine the mounting surface where the ground strap will be attached. See Section 6.A.(1).

6.D.(7) Mount the shocks mounts with two each #6-32 fasteners and lock-nuts, installing the ground strap under the appropriate shock mount.

6.D.(8) Attach the mounting tray to the four shock mounts, installing the ground strap.

6.D.(9) Slide the KRX 1053 Receiver/Exciter into the mounting tray. Secure the KRX 1053 Receiver/Exciter into place on the mounting tray with the fluted knob. Provisions for safety wire installation is provided, if desired.

6.E. Compatible Control Display Unit Installation

For installation information on the PS440, refer to the PS440 Control Display Unit Installation Manual P/N 006-10655-XXXX.

For installation information on the MCDU Multifunction Contol and Display Unit, refer to Installation Manual P/N: XXXX.

For installation information on the RM-855 Radio Management Unit, refer to Installation Manual P/N: XXXX.

6.F. Antenna Installation

6.F.(1) Selecting an Antenna Configuration.

While numerous options are available in the choice of antenna configurations, some configurations will be better suited for a particular installation than others. Refer to section 5.B.(7) when selecting an antenna configuration.

6.F.(2) Refer to section 6.A.(1) for special bonding consideration when installing an antenna configuration.

7. Inspection, System Checkout, and Flight Test Procedures

7.A. Inspection

Table 2010 is a visual inspection/check procedure that should be performed after the system installation as part of a system checkout. In addition, the procedure can be used as periodic maintenance inspection check.

EQUIPMENT		INSPECTION/CHECK PROCEDURE
KAC 1052	1. 2.	Verify that all connections to the KAC 1052 are secure. Verify that the ground strap is connected to the ground post.
KPA 1052	1. 2.	Verify that all connections to the KPA 1052 are secure. Verify that all coaxial cables are properly connected to the KRX 1053 and the KAC 1052.
KRX 1053	1. 2.	Verify that all connections to the KAC 1052 are secure. Verify that the controller connector is secure.
Antenna		Verify that the antenna HN connector is securely tightened.

Visual Inspection Procedure
Table 2010

7.B. System Checkout

7.B.(1) General

The KHF 1050 HF Communication System requires three stages of post-installation testing to ensure proper operation: (1) A system interwiring check is performed before installation of system components and before power is applied, to verify that all aircraft and HF system interconnections are correct. Continuity of power pins is double-checked. (2) After system components are installed, a visual inspection of the equipment and connections is made. (3) The post-installation test applies power to system components and checks out system functions.

7.B.(2) System Interwiring Check

7.B.(2)(a) Check that all cables and interwiring are installed according to the interwiring and cable fabrication instructions (section 5.C).

7.B.(2)(b) Check that all functions are properly strapped to reflect the aircraft system configuration (section 5.D).

7.B.(2)(c) Double-check continuity of all power pins.

7.B.(3) Visual Inspection

Perform the visual inspection/check procedure (Table 2010).

7.B.(4) Post-Installation Test

7.B.(4)(a) Perform the System Performance Check in FAULT ISOLATION, Section 2.

7.B.(4)(b) Establish communications with another HF station in each of the six communication bands (see Table 2011). Request a signal/audio quality report.

7.C. Flight Test

While in flight, establish communications with another HF station. It is important that the frequencies selected be apropriate for the distance between the aircraft and the other station (see Table 2011). Request a signal and audio quality report, preferably on several different operating frequencies.

Frequency Band (MHz)	Daytime Distance (miles)	Nighttime Distance (miles)
2.8	up to 100	up to 400
4.4	up to 200	up to 1000
5.5	up to 300	100 to 1200
6.5	100 to 600	200 to 1500 or greater
8.8	200 to 800	400 to 1500 or greater*

Frequency Band (MHz)	Daytime Distance (miles)	Nighttime Distance (miles)
10.0	300 to 1000	500 to 1800 or greater*
11.1	400 to 1200	600 to 1800 or greater*
13.3	600 to 1500 or greater	often unusable
17.9	700 to 1800 or greater*	often unusable
21.9	900 to 1800 or greater*	often unusable
NOTE: HF propagation is dependent on the condition of the ionisphere. Occasionally, distances significantly different than those indicated above may be realized.		
* At at times, communication may not be possible on this band during this time.		

Typical HF Signal Propagation Distance
for Common Aviation Bands
Table 2011

8. Removal and Re-installation

CAUTION: Remove all power before performing removal and re-installation procedures.

8.A. KAC 1052 Antenna Coupler Removal and Re-installation

8.A.(1) KAC 1052 Antenna Coupler Removal

8.A.(1)(a) Detach cables from connector J10521.

8.A.(1)(b) Remove nut and washer on the GND post. Detach ground strap. Replace nut and washer on the GND post.

8.A.(1)(c) Loosen retaining screw clamp loacted at the front of the KAC 1052 Antenna Coupler. Remove unit from rack.

8.A.(2) KAC 1052 Antenna Coupler Re-installation

8.A.(2)(a) Slide the KAC 1052 Power Amplifier gently into the mounting rack.

8.A.(2)(b) Engage and tighten retaining screw clamps to secure unit.

8.A.(2)(c) Reconnect appropriate cables to connector J10521.

8.B. KPA 1052 Power Amplifier Removal and Re-installation

8.B.(1) KPA 1052 Power Amplifier Removal

8.B.(1)(a) Detach cables from connector J10524.

8.B.(1)(b) Remove nut and washer on the GND post. Detach ground strap. Replace nut and washer on the GND post.

8.B.(1)(c) Loosen retaining screw clamp loacted at the front of the KPA 1052 Power Amplifier. Remove unit from rack.

8.B.(2) KPA 1052 Power Amplifier Re-installation

8.B.(2)(a) Slide the KPA 1052 Power Amplifier gently into the mounting rack.

8.B.(2)(b) Engage and tighten retaining screw clamps to secure unit.

8.B.(2)(c) Reconnect appropriate cables to connector J10524.

8.C. KRX 1053 Receiver/Exciter Removal and Re-installation

8.C.(1) KRX 1053 Receiver/Exciter Removal

8.C.(1)(a) Detach cables from connector J10531.

8.C.(1)(b) Loosen retaining screw clamp located at the front of the KRX 1053 Receiver/Exciter. Remove unit from mounting rack.

8.C.(2) KRX 1053 Receiver/Exciter Re-installation

8.C.(2)(a) Slide the KRX 1053 Receiver/Exciter gently into the mounting tray.

8.C.(2)(b) Engage and tighten retaining screw clamps to secure unit.

8.C.(2)(c) Reconnect appropriate cables to connector J10531.

8.D. Control Unit Removal and Re-installation

Refer to the installation manual for the PS440 Control Display Unit, P/N 006-10655-XXXX, for PS440 removal and re-installaton instructions.

Refer to the installation manual for the MCDU, P/N XXXX, for MCDU removal and re-installation instructions.

Refer to the installation manual for the RM-855, P/N XXXX, for RM-855 removal and re-installation instructions.

9. Maintenance Procedures

9.A. In-Aircraft Adjustments

9.A.(1) General

All alignment and adjustment procedures are accomplished during bench maintenance. When unit performance indicates an adjustment or an alignment is required technician should remove the unit from the aircraft, then reference should be made to the related Maintenance Manual.

9.A.(2) Audio Levels

The audio inputs and outputs of the KRX 1053 are factory adjusted to the following levels:

- Receiver/Sidetone: 7.75 Vrms into 600 ohms at maximum volume
- Data Input: 0.775 Vrms across 600 ohms
- Microphone Input: 200 mVrms to 2 Vrms (typical) into 150 ohms
- Data Output: 1.775 Vrms into 600 ohms
- SELCAL Output: 0.775 Vrms into 600 ohms

If necessary, these levels may be adjusted for compatibility with other aircraft systems. To access the adjustments, loosen the two Dzues fasteners on the top of the unit and remove the dust cover. Refer to Figure 2020 for adjustment locations. Replace and secure the dust cover once the adjustment is complete.

9.B. System Protection

The KHF 1050 system is primarily protected by circuit breakers located at the circuit breaker panel in the aircraft. The KPA 1052 contains an internal fuse for additional protection.

9.C. Lubrication

No lubrication is required. There are no moving parts that require lubrication in the KHF 1050 HF Communication System.

9.D. Cleaning

The exterior of the units should be wiped with lint-free cloth dampened with the approved cleaning agent, when deemed necessary, depending upon environmental exposure and intensity of use.

NOTE: Limit cleaning of equipment interiors to that required at bench overhaul.

10. System Maintenance Programs

10.A.System Maintenance Recommendations

10.A.(1) Perform a system performance check when a component of the system is replaced or installed.

10.A.(2) To confirm satisfactory system operation a system performance test may be performed as required.

10.A.(3) After major aircraft maintenance cycles a system performance check should be performed.

Audio Level Adjustments

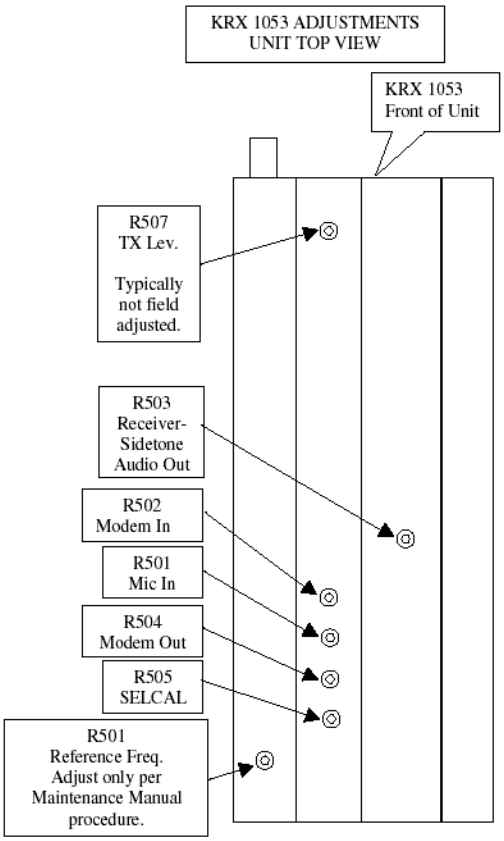
The audio inputs and outputs of the KRX 1053 are factory adjusted to the following levels:

- Receiver/Sidtone: 7.75 Vrms in to 600 Ohms at max volume.
- Modem Input: 0.775 Vrms across 600 Ohms. See Note 1.
- Mic Input: 200 mV to 2 Vrms typical into 150 Ohms.
- Modem Output: 0.775 Vrms into 600 Ohms.
- SELCAL Output: 0.775 Vrms into 600 Ohms.

If necessary, these levels may adjusted to be compatible with other aircraft systems. To access the adjustments, loosen the two Dzue fasteners on the top of the unit and remove the dust cover. Refer to figure ??? for adjustment locations. Replace and secure the dust cover when the adjustment is complete.

Note 1:
Modem Input Adjustment Procedure.

a. Remove the coax between J10532 and J10526. Terminate J10526 with 50 ohms.
b. Apply the modulation signal from the external modem, operating at its maximum operating level, to the KRX 1053 Modem Audio Input.
c. Monitor the exciter output (J10532) on an oscilloscope with a 50 Ohm termination.
d. With the system in the USB Data mode and the External Data Keyline grounded, adjust R502 to yield 0.33 V peak-peak on the oscilloscope.



KRX 1050 Adjustments
Figure 2020

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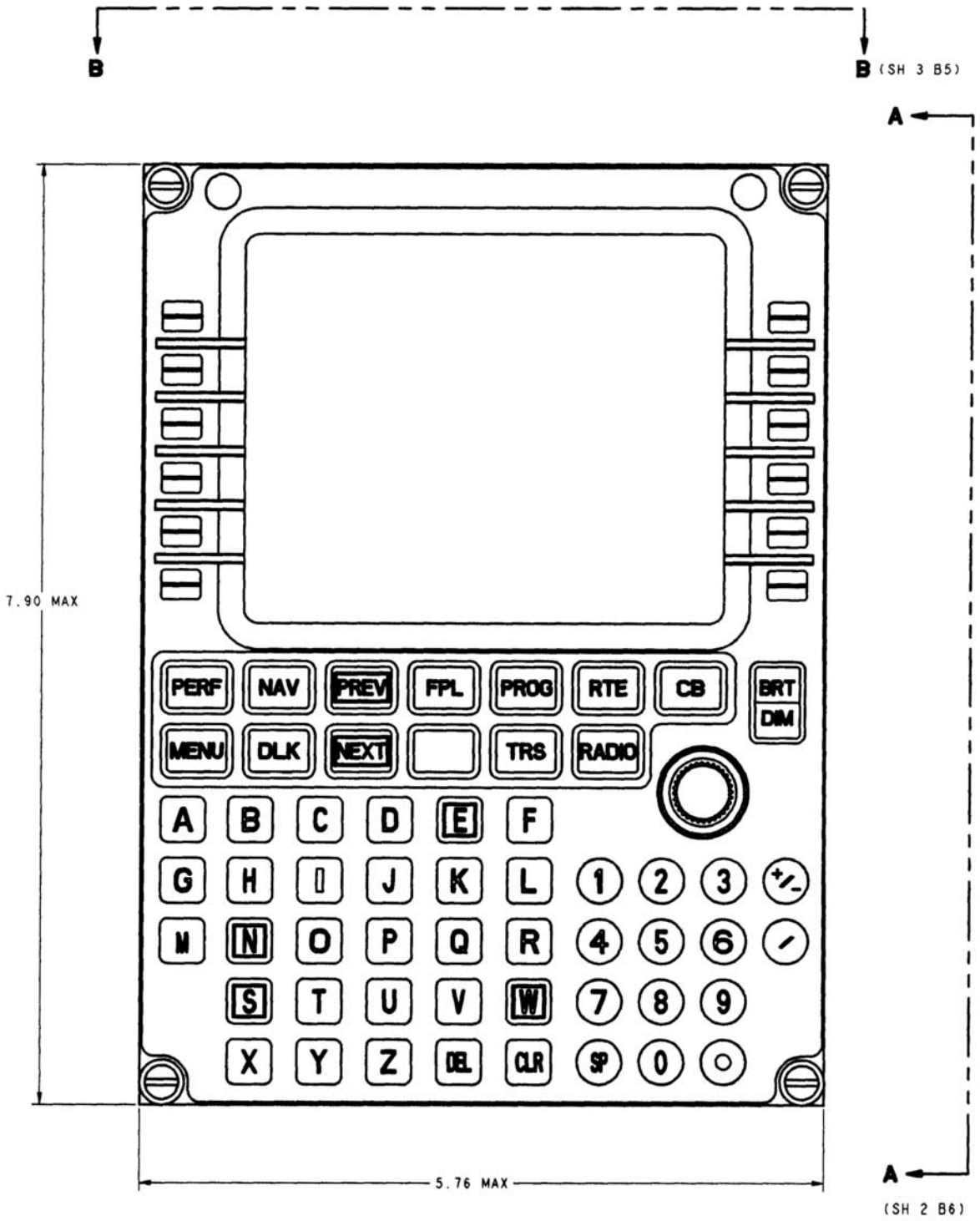
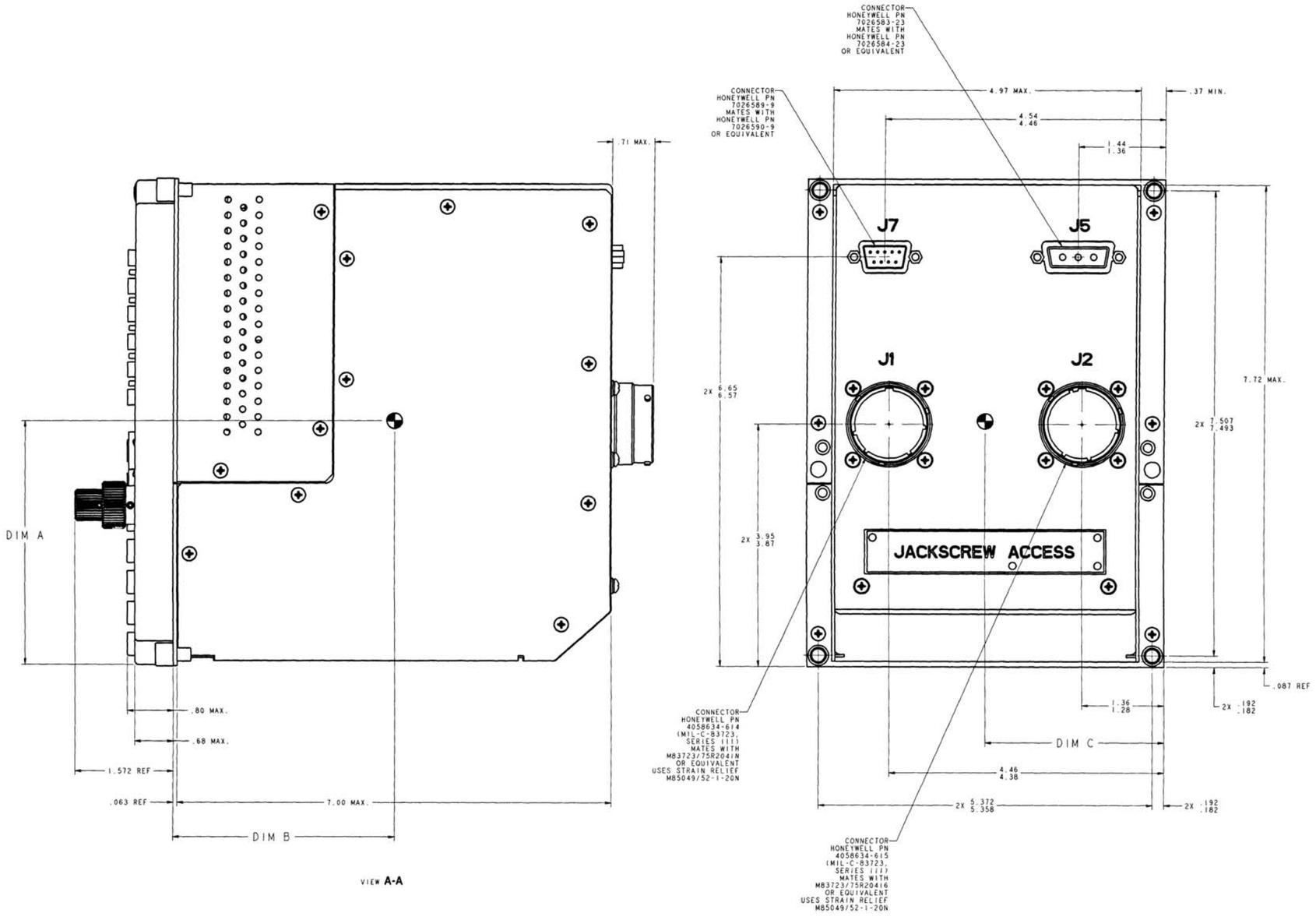
COMMENTARY: INSERT OUTLINE DRAWING HERE WHEN AVAILABLE

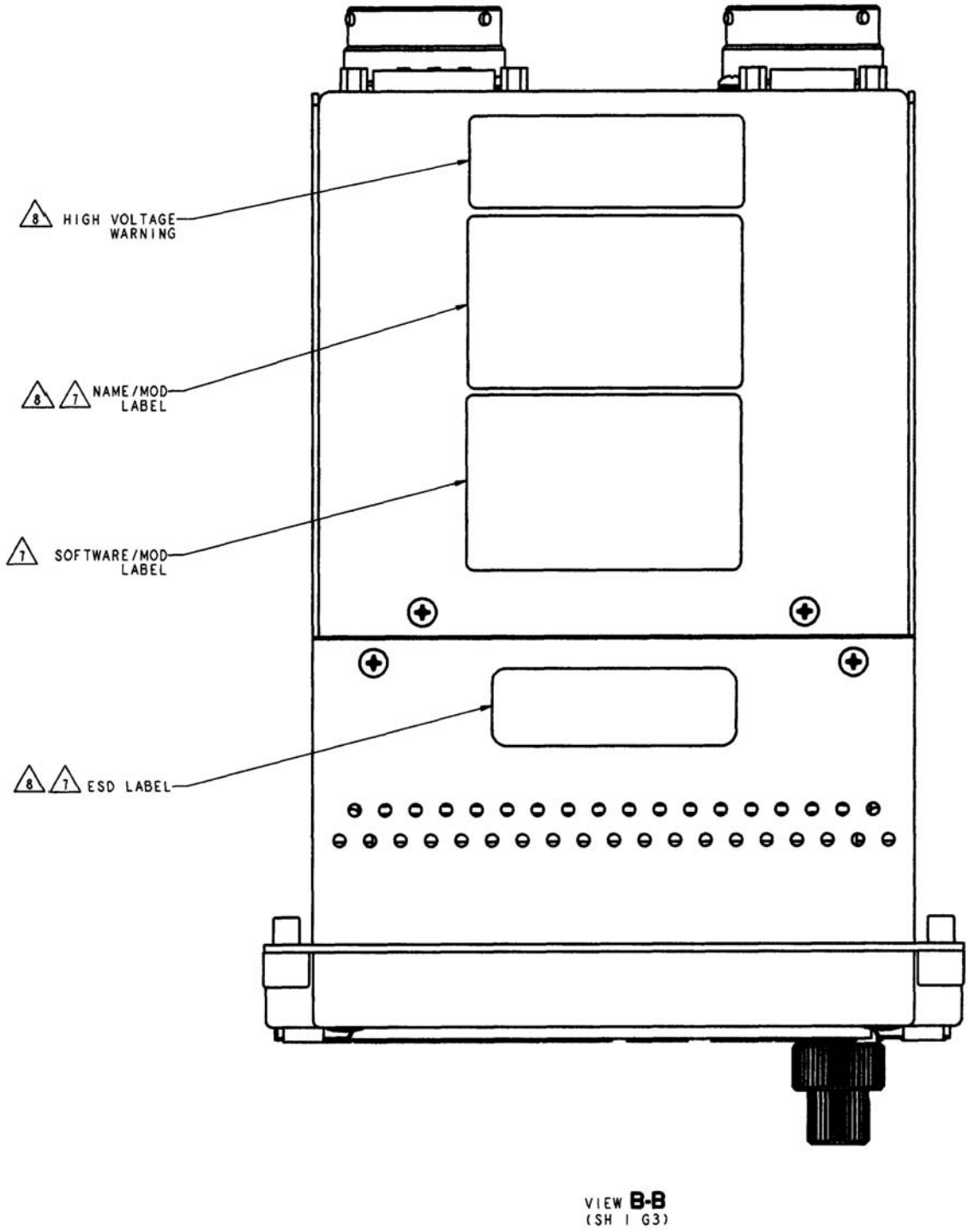
PS440 Control Display Unit Outline and Mounting
(Dwg P/N ????)
Figure 2022



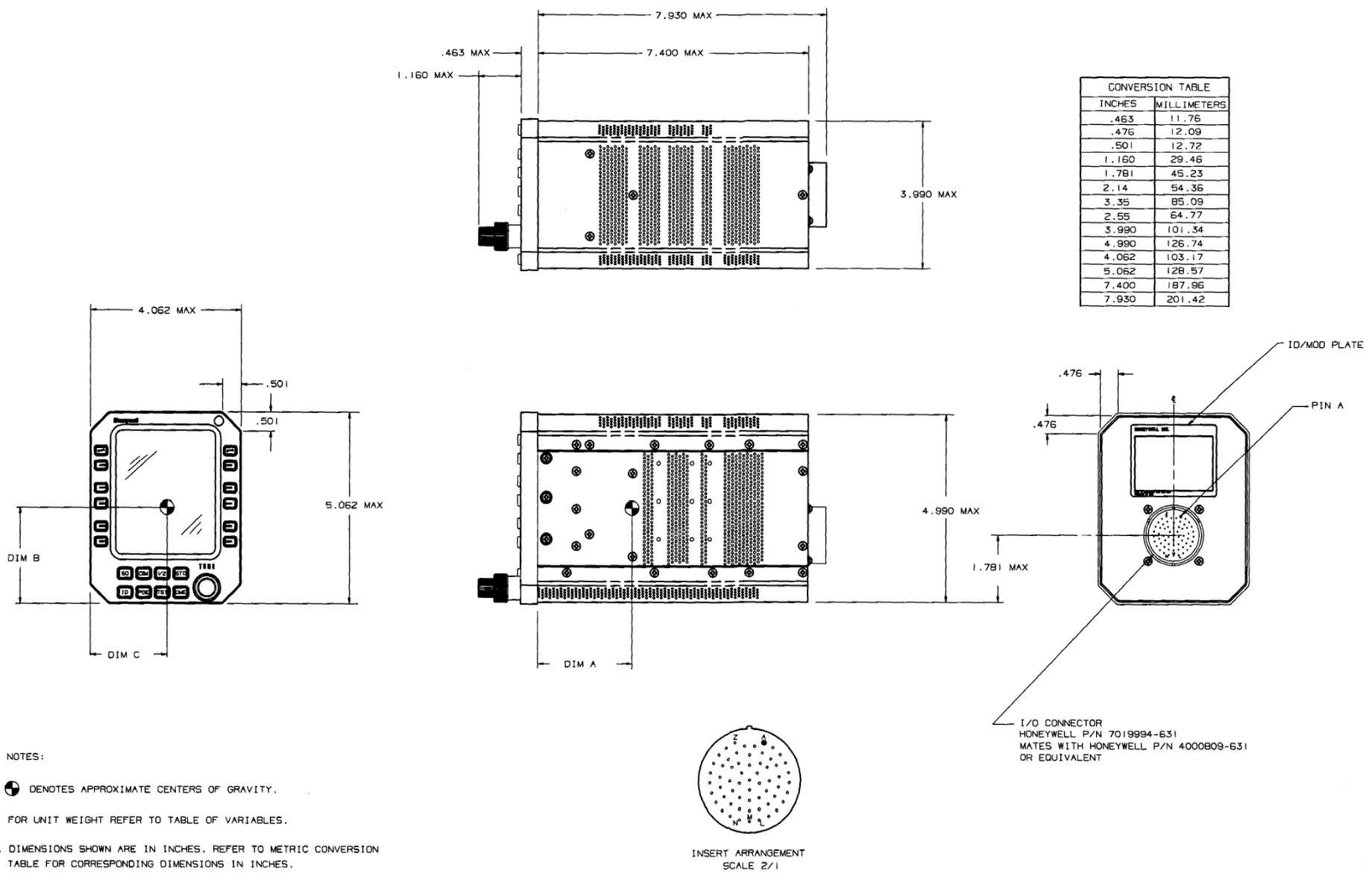
MCDU Multifunction Control and Display Unit Outline and Mounting
(Dwg P/N 7025726-930 - Sheet 1 of 3)
Figure 2023



MCDU Multfunction Control Display Unit Outline and Mounting
(Dwg P/N 7025726-930 - Sheet 2 of 3)
Figure 2024



MCDU Multifunction Control and Display Unit Outline and Mounting
(Dwg P/N 7025726-930 - Sheet 3 of 3)
Figure 2025



CONVERSION TABLE	
INCHES	MILLIMETERS
.463	11.76
.476	12.09
.501	12.72
1.160	29.46
1.781	45.23
2.14	54.36
3.35	85.09
2.55	64.77
3.990	101.34
4.990	126.74
4.062	103.17
5.062	128.57
7.400	187.96
7.930	201.42

NOTES:

1. ⊕ DENOTES APPROXIMATE CENTERS OF GRAVITY.
2. FOR UNIT WEIGHT REFER TO TABLE OF VARIABLES.
3. DIMENSIONS SHOWN ARE IN INCHES. REFER TO METRIC CONVERSION TABLE FOR CORRESPONDING DIMENSIONS IN INCHES.
4. THIS DRAWING APPLIES TO ALL VARIABLES OF REMOTE MANAGEMENT UNIT 7013270.
5. RECOMMENDED MOUNTING CLAMP: HONEYWELL PART NO. 7000066-9.
   ALTERNATE USABLE CLAMP: HONEYWELL PART NO. 7000066-11.

INSERT ARRANGEMENT
SCALE 2/1

RM-855 Radio Management Unit Outline and Mounting
(Dwg P/N 7013270 sheet 1 of 2)
Figure 2026

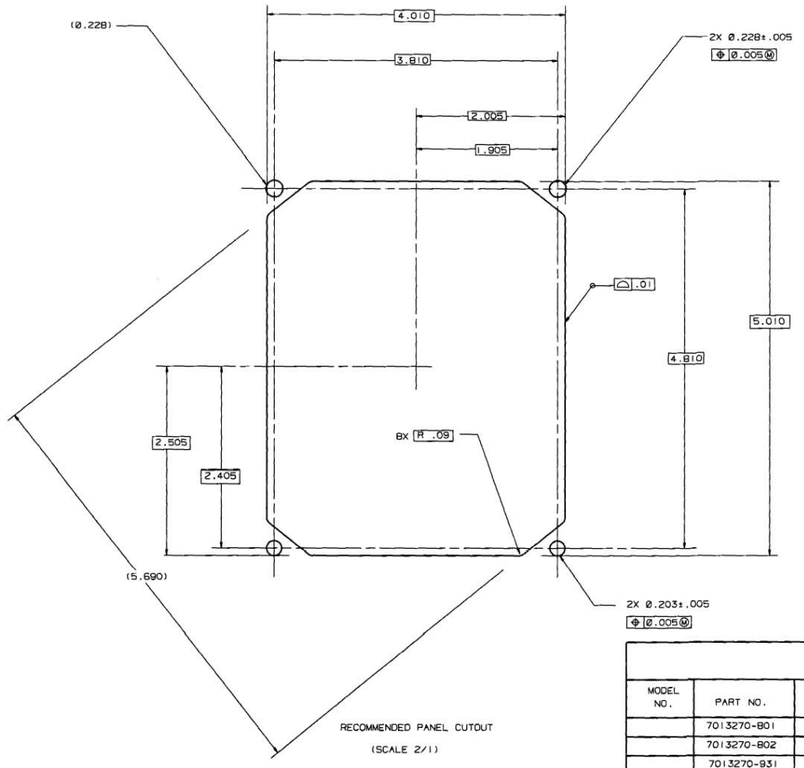
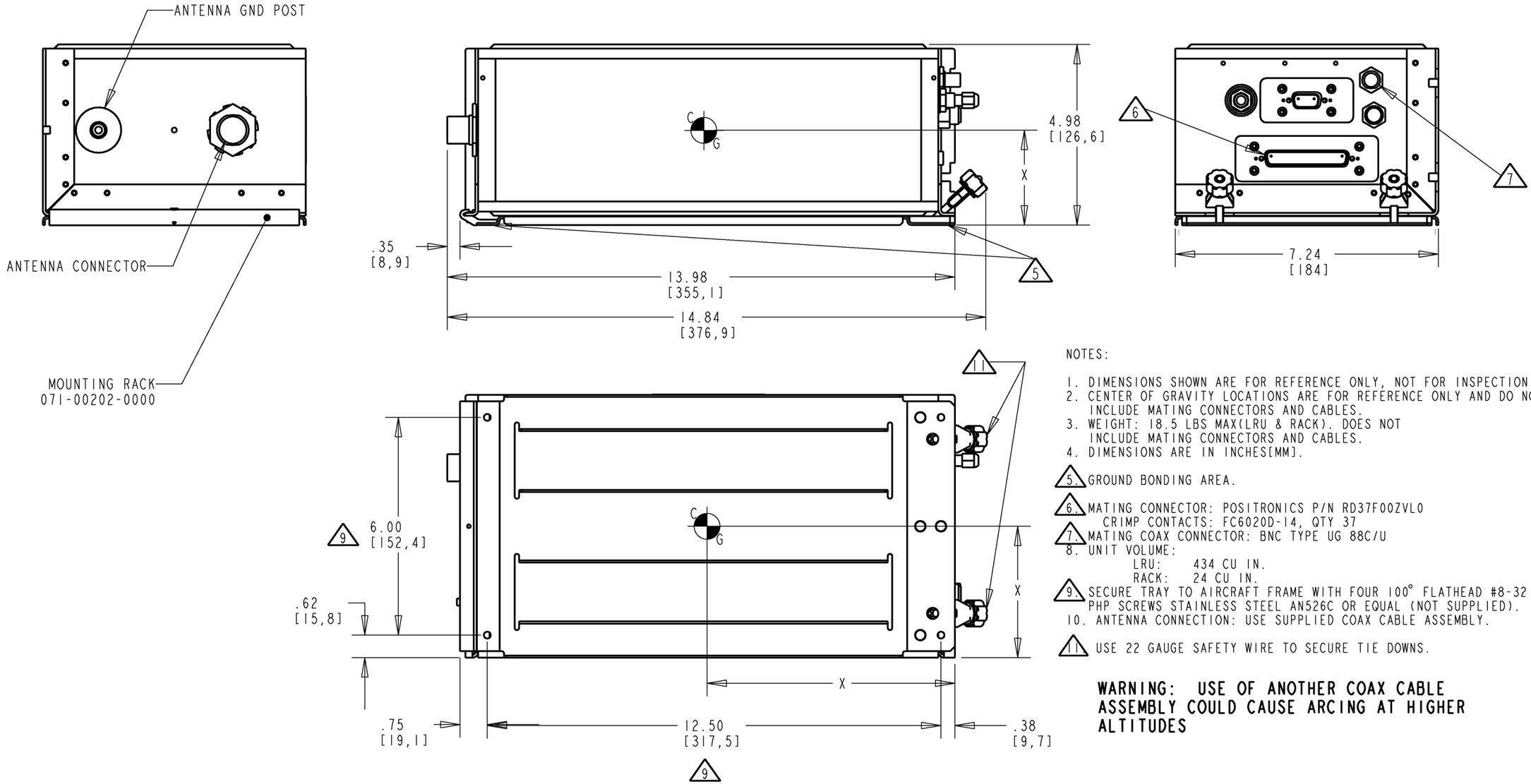


TABLE OF VARIABLES

MODEL NO.	PART NO.	INTEGRATED TEST SPEC	MARKINGS UNLESS OTHERWISE SPECIFIED	AREA LIGHTING		MAX WEIGHT		CENTER OF GRAVITY			BEZEL COLOR
				VOLTAGE	COLOR	LBS	(KG)	DIM A	DIM B	DIM C	
	7013270-801	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-802	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-931	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-932	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-933	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-934	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-935	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-936	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-941	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-942	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-943	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-944	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-951	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-952	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-961	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-962	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-963	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-964	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-965	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-966	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK
	7013270-967	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	GRAY
	7013270-968	IT7013270	WHITE	5V/28V	BLU/WHT	5.1	2.31	3.35	2.55	2.14	BLACK

RM-855 Radio Management Unit Outline and Mounting
(Dwg P/N 7013270 sheet 2 of 2)
Figure 2927



NOTES:

1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY, NOT FOR INSPECTION.
2. CENTER OF GRAVITY LOCATIONS ARE FOR REFERENCE ONLY AND DO NOT INCLUDE MATING CONNECTORS AND CABLES.
3. WEIGHT: 18.5 LBS MAX(LRU & RACK). DOES NOT INCLUDE MATING CONNECTORS AND CABLES.
4. DIMENSIONS ARE IN INCHES[MM].

5. GROUND BONDING AREA.

6. MATING CONNECTOR: POSITRONICS P/N RD37F00ZVL0
   CRIMP CONTACTS: FC6020D-14, QTY 37

7. MATING COAX CONNECTOR: BNC TYPE UG 88C/U

8. UNIT VOLUME:
   LRU: 434 CU IN.
   RACK: 24 CU IN.

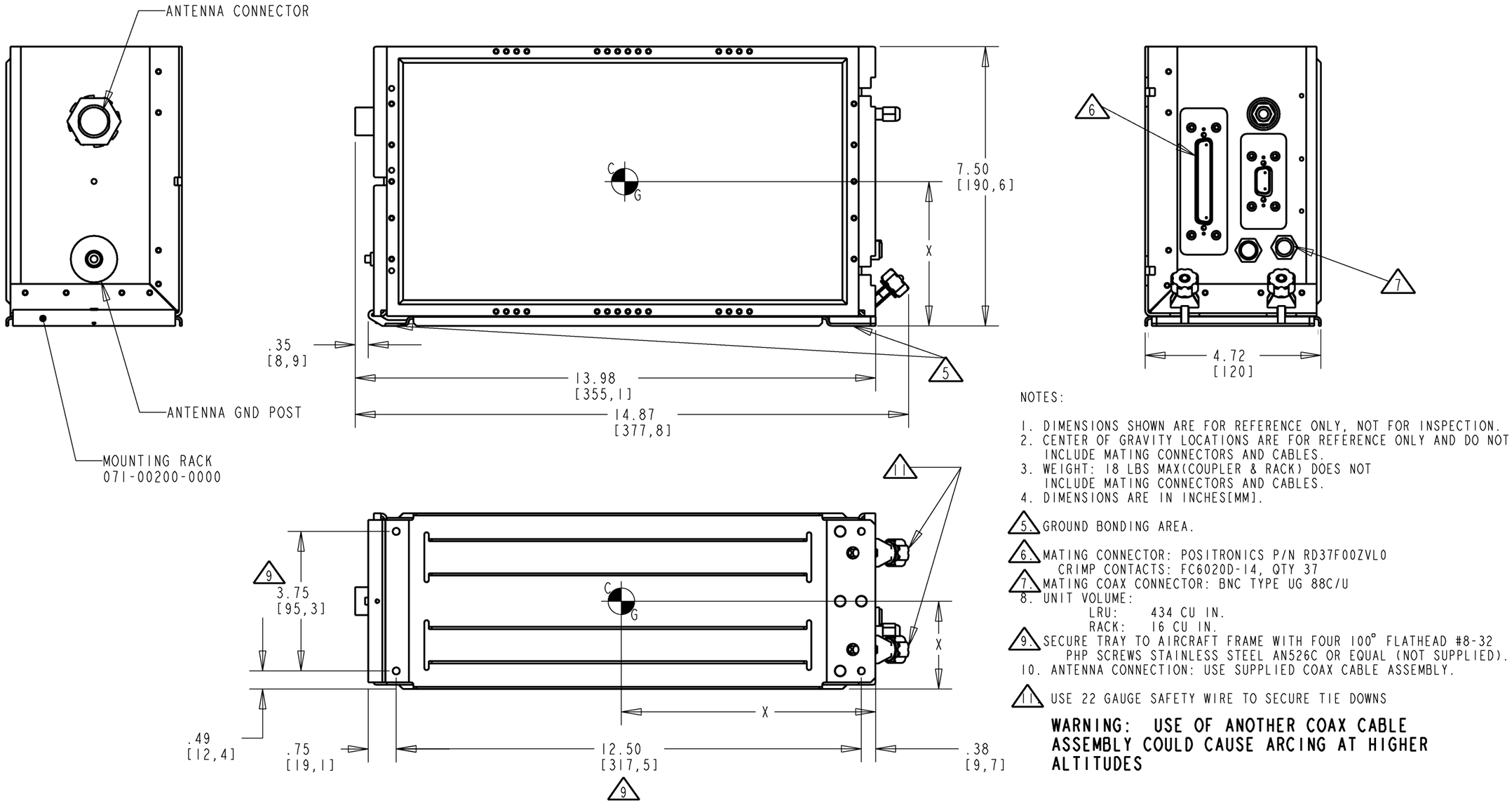
9. SECURE TRAY TO AIRCRAFT FRAME WITH FOUR 100° FLATHEAD #8-32 PHP SCREWS STAINLESS STEEL AN526C OR EQUAL (NOT SUPPLIED).

10. ANTENNA CONNECTION: USE SUPPLIED COAX CABLE ASSEMBLY.

11. USE 22 GAUGE SAFETY WIRE TO SECURE TIE DOWNS.

WARNING: USE OF ANOTHER COAX CABLE ASSEMBLY COULD CAUSE ARCING AT HIGHER ALTITUDES

KAC 1052 Antenna Coupler Single Horizontal Outline and Mounting
(Dwg P/N 155-01774-0000)
Figure 2028



NOTES:

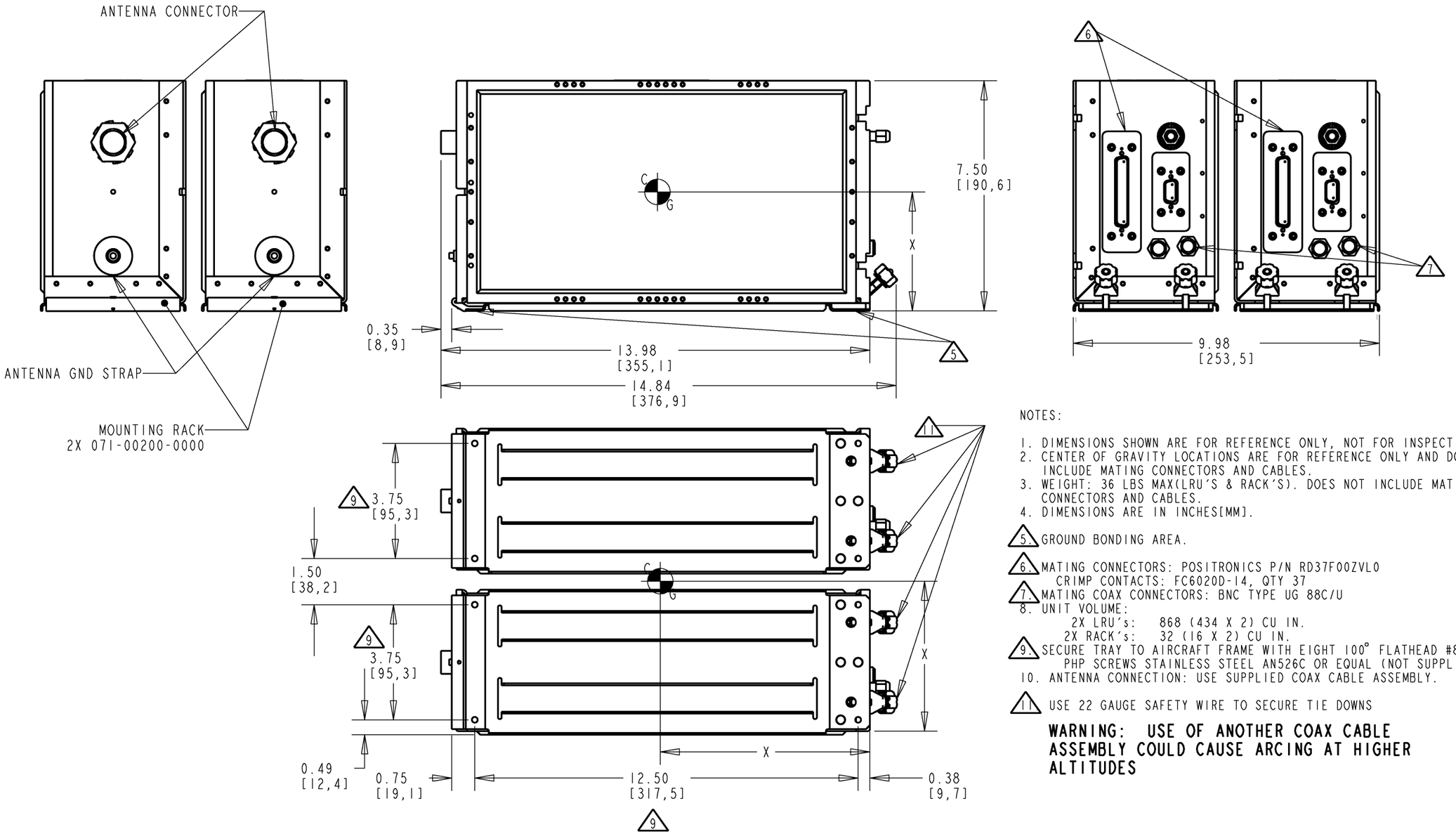
1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY, NOT FOR INSPECTION.
2. CENTER OF GRAVITY LOCATIONS ARE FOR REFERENCE ONLY AND DO NOT INCLUDE MATING CONNECTORS AND CABLES.
3. WEIGHT: 18 LBS MAX(COUPLER & RACK) DOES NOT INCLUDE MATING CONNECTORS AND CABLES.
4. DIMENSIONS ARE IN INCHES[MM].

5. GROUND BONDING AREA.

6. MATING CONNECTOR: POSITRONICS P/N RD37F00ZVL0
   CRIMP CONTACTS: FC6020D-14, QTY 37
7. MATING COAX CONNECTOR: BNC TYPE UG 88C/U
8. UNIT VOLUME:
   LRU: 434 CU IN.
   RACK: 16 CU IN.
9. SECURE TRAY TO AIRCRAFT FRAME WITH FOUR 100° FLATHEAD #8-32 PHP SCREWS STAINLESS STEEL AN526C OR EQUAL (NOT SUPPLIED).
10. ANTENNA CONNECTION: USE SUPPLIED COAX CABLE ASSEMBLY.
11. USE 22 GAUGE SAFETY WIRE TO SECURE TIE DOWNS

WARNING: USE OF ANOTHER COAX CABLE ASSEMBLY COULD CAUSE ARCING AT HIGHER ALTITUDES

KAC 1052 Antenna Coupler Single Vertical Outline and Mounting
(Dwg P/N 155-01772-0000)
Figure 2029



NOTES:

1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY, NOT FOR INSPECTION.
2. CENTER OF GRAVITY LOCATIONS ARE FOR REFERENCE ONLY AND DO NOT INCLUDE MATING CONNECTORS AND CABLES.
3. WEIGHT: 36 LBS MAX(LRU'S & RACK'S). DOES NOT INCLUDE MATING CONNECTORS AND CABLES.
4. DIMENSIONS ARE IN INCHES[MM].

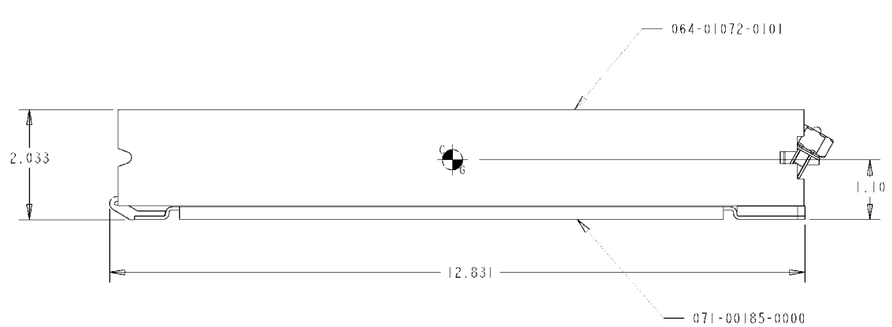
5. GROUND BONDING AREA.

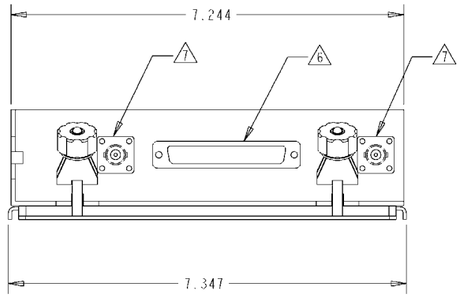
6. MATING CONNECTORS: POSITRONICS P/N RD37F00ZVL0
   CRIMP CONTACTS: FC6020D-14, QTY 37
7. MATING COAX CONNECTORS: BNC TYPE UG 88C/U
8. UNIT VOLUME:
   2X LRU's: 868 (434 X 2) CU IN.
   2X RACK's: 32 (16 X 2) CU IN.
9. SECURE TRAY TO AIRCRAFT FRAME WITH EIGHT 100° FLATHEAD #8-32 PHP SCREWS STAINLESS STEEL AN526C OR EQUAL (NOT SUPPLIED).
10. ANTENNA CONNECTION: USE SUPPLIED COAX CABLE ASSEMBLY.

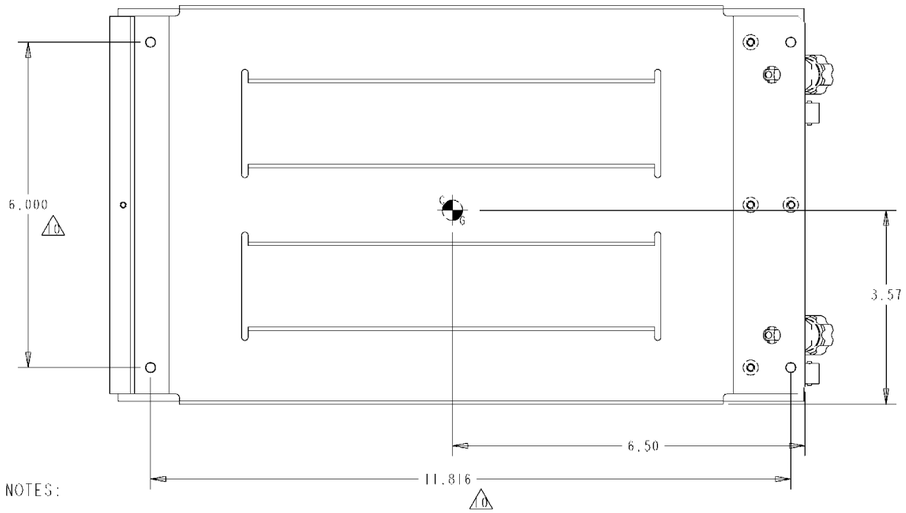
11. USE 22 GAUGE SAFETY WIRE TO SECURE TIE DOWNS

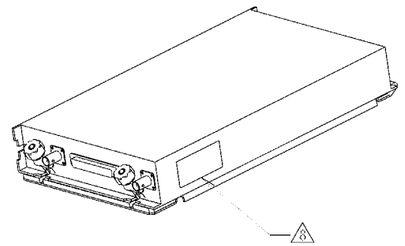
WARNING: USE OF ANOTHER COAX CABLE ASSEMBLY COULD CAUSE ARCING AT HIGHER ALTITUDES

KAC 1052 Antenna Coupler Dual Vertical Outline and Mounting
(Dwg P/N 155-01775-0000)
Figure 2030





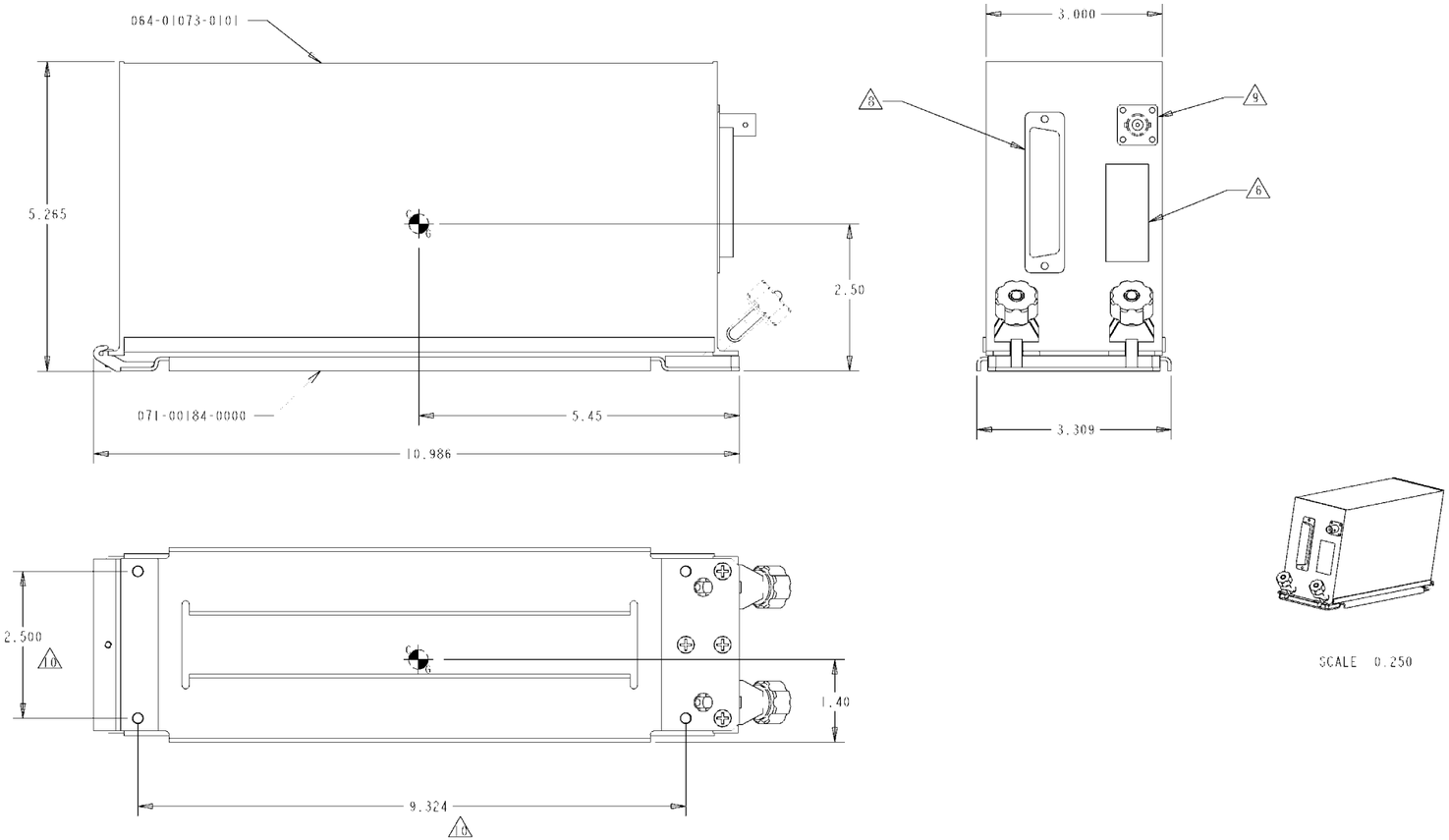




NOTES:

1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY, NOT FOR INSPECTION.
2. CENTER OF GRAVITY LOCATIONS ARE FOR REFERENCE ONLY AND DO NOT INCLUDE MATING CONNECTORS AND CABLES.
3. WEIGHT: 7.69 LBS NOMINAL ± 15% DOES NOT INCLUDE MATING CONNECTORS AND CABLES.
4. DIMENSIONS ARE IN INCHES.
5. GROUND BONDING AREA.
6. MATING CONNECTOR: POSITRONICS P/N CBC27W2F00ZVL0
   CRIMP TERMINATIONS- SIGNAL CONTACTS: FC6020D-14, QTY 25
   POWER CONTACTS: FC4008D-14, QTY 2
7. MATING COAX CONNECTOR: BNC TYPE UG 88C/U
8. UNIT IDENTITY LABEL, THIS SURFACE.
9. UNIT VOLUME: 154 CU IN.
10. SECURE TRAY TO AIRCRAFT FRAME WITH FOUR #8-32 PHP SCREWS STAINLESS STEEL AN526C OR EQUAL (NOT SUPPLIED).

KPA 1052 Power Amplifier Outline and Mounting
(Dwg P/N 155-01750-0000)
Figure 2031



NOTES:

1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY, NOT FOR INSPECTION.
2. CENTER OF GRAVITY LOCATIONS ARE FOR REFERENCE ONLY AND DO NOT INCLUDE MATING CONNECTORS AND CABLES.
3. WEIGHT: 5.91 LBS NOMINAL ± 15% DOES NOT INCLUDE MATING CONNECTORS AND CABLES.
4. DIMENSIONS ARE IN INCHES.
5. GROUND BONDING AREA.
6. UNIT IDENTITY LABEL, THIS SURFACE.
7. UNIT VOLUME: 158 CU IN.
8. MATING CONNECTOR: POSITRONICS DD104F00Y00
   CRIMP CONTACTS: FC8022D-14, QTY: 104
9. MATING CONNECTOR: BNC TYPE UG 88C/U
10. SECURE TRAY TO AIRCRAFT FRAME WITH FOUR #8-32 PHP SCREWS STAINLESS STEEL AN526C OR EQUAL (NOT SUPPLIED).

KRX 1053 Receiver/Exciter Outline and Mounting
(Dwg P/N 155-01751-0000)
Figure 2032

COMMENTARY: INSERT INTERCONNECT DRAWING HERE WHEN AVAILABLE

KHF 1050 HF System Interconnect
(Dwg P/N 155-01762-0000)
Figure 2033

COMMENTARY: INSERT KAC 1052 QUALIFICATION FORM HERE WHEN AVAILABLE.

COMMENTARY: INSERT KPA 1Ø52 QUALIFICATION FORM HERE WHEN AVAILABLE.

COMMENTARY: INSERT KRX 1Ø53 QUALIFICATION FORM HERE WHEN AVAILABLE.